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ACUTE POLIOMYELITIS IN PREGNANCY

Report of Thirty Cases

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DURING the Minnesota poliomyelitis epidemic in the summer of 1946, a total of 695 patients with acute poliomyelitis were admitted to the Minneapolis General Hospital on the contagion service between July 29 and September 21. Of this group, 115 were women between the ages of fifteen and forty-five years, and of this last group, thirty were pregnant. The ages of these pregnant women varied between seventeen and thirty-two years. Stages of gestation at the time of admission varied between six weeks and nine lunar months. Seven women were admitted during the first trimester of pregnancy, sixteen during the second trimester, and seven during the third trimester. Determination of the length of gestation was based on history, physical findings, and in case of abortion, on fetal and placental findings. There were seven cases of spontaneous abortion which occurred in patients with various types of poliomyelitis, and at various periods of gestation, as is shown in Table I. Three women had signs of threatened abortion, such as low abdominal cramping pain and vaginal spotting, but did not go on to abort. One woman with bulbar poliomyelitis, who aborted on the third day following admission, expired as a result of respiratory failure on the seventh day.

Four patients were delivered in the Minneapolis General Hospital during their admission for poliomyelitis. One of these was a spontaneous delivery, and two were low forceps deliveries. Two of these infants were apparently normal, but one of those delivered with low forceps had an occipital-frontal diameter of 36.5 centimeters. One living fetus of seven lunar months' gestation was surgically removed from the mother immediately after her death.

Twelve deliveries were carried out by private physicians after discharge of the mother from the Minneapolis General Hospital. Seven of these deliveries were spontaneous or by outlet forceps extraction, and the infants were normal and full-term. Patient No. 6 was delivered by cesarean section. This mother had had a previous difficult delivery, pelvic measurements of questionable adequacy, and a history of rickets. Patient No. 8 was delivered spontaneously of a 2,174 gram infant which was normal aside from prematurity, the length of gestation being thirty-six weeks. Patient No. 7 was delivered of an 1,812 gram infant by breech extraction. This last infant was a footling, and the length of gestation was approximately thirty-six weeks. The present diagnosis of this infant is osteogenesis imperfecta, and it has bilateral fractures of the femurs. Patient No. 19 was delivered spontaneously of a macerated stillborn fetus. The estimated length of gestation was thirty-six weeks, despite the small estimated weight of 900 to 1,350 grams and the relatively underdeveloped state of the fetus.

Patient No. 3 spent twelve days in a respirator, and on the fifth day of this period went into labor spontaneously and was delivered of a slightly macerated fetus by low forceps extraction. The fetus weighed 3,130 grams, measured 52 centimeters, crown-heel length, and was found to have a horseshoe kidney. During the mother's stay in the res-

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TABLE I. PREGNANT NONPARALYTIC POLIOMYELITIS ADMISSIONS TO MINNEAPOLIS GENERAL HOSPITAL, JULY 29 TO SEPTEMBER 21, 1946

Case No.	Admission Date	Age	Parity	Admission Length of Gestation	Termination of Pregnancy	Poliomyelitis Status on March 15, 1947
1	8- 2-46	20	1	12 weeks	Normal spontaneous delivery 1-25-47	No residual paralysis
5	8- 2-46	21	1	36 weeks	Normal spontaneous delivery 8-31-46	No residual paralysis
6	8- 4-46	25	2	38 weeks	Cesarean section—contracted pelvis 8-24-46	No residual paralysis
7	8- 7-46	20	0	14 weeks	Breech extraction premature infant with osteogenesis imperfecta 12-25-46	No residual paralysis
8	8- 7-46	31	2	10 weeks	Normal spontaneous delivery	Generalized weakness and fatiguability
9	8- 9-46	19	1	12 weeks	Unknown	Unknown
10	8- 9-46	27	0	24 weeks	Normal spontaneous delivery	No residual paralysis
14	9-11-46	17	0	18 weeks	Unknown	Unknown
16	9-12-46	21	0	38 weeks	Brow: manual conversion to occiput posterior. Difficult low forceps extraction.	No residual paralysis
18	9- 7-46	17	0	20 weeks	Unknown	Unknown
21	8-11-46	19	0	26 weeks	Normal spontaneous delivery 12-2-46	Weakness of right leg and knee
22	8-11-46	20	0	18 weeks	Normal spontaneous delivery	No residual paralysis
23	8-14-46	31	1	20 weeks	Spontaneous abortion 8-15-46	No residual paralysis
26	8-27-46	32	1	18 weeks	Spontaneous abortion 9-1-46	No residual paralysis
27	8-14-46	16	0	8 weeks	Spontaneous abortion 8-19-46	No residual paralysis
28	8-10-46	20	?	24-26 weeks	Spontaneous abortion	No residual paralysis
29	9-10-46	17	?	20 weeks	Spontaneous abortion 9-14-46	No residual paralysis

TABLE II. PREGNANT BULBAR AND SPINAL PARALYTIC POLIOMYELITIS ADMISSIONS TO MINNEAPOLIS GENERAL HOSPITAL, JULY 29 TO SEPTEMBER 21, 1946

Case No.	Admission Date	Age	Parity	Admission Length of Gestation	Termination of Pregnancy	Poliomyelitis Status on March 15, 1947
2	8- 2-46	30	1	20 weeks	Death of mother 8-4-46	Bulbar and spinal paralytic types. Respiratory death.
3	7-29-46	20	1	36 weeks	Low forceps extraction of a slightly macerated fetus 8-12-46	Spinal paralytic type. Death 8-17-46. Probable pulmonary embolus
4	7-31-46	17	0	6 weeks	Spontaneous incomplete abortion 8-2-46	Bulbar type. Respiratory death 8-5-46
11	8-13-46	23	1	37 weeks	Normal spontaneous delivery 9-7-46	Spinal paralytic type. Minimal stiffness of legs 9-20-46
12	9- 7-46	22	0	18 weeks	Normal spontaneous delivery	Spinal paralytic type. No residual paralysis
13	9- 9-46	26	1	18 weeks	Normal spontaneous delivery	Bulbar type. No residual paralysis
15	8-30-46	17	0	20 weeks	Death of mother 8-31-46	Bulbar type. Respiratory death
17	8-11-46	25	1	20 weeks	Death of mother 8-11-46	Bulbar type. Respiratory death
19	9-21-46	28	3	12 weeks	Spontaneous delivery of a macerated premature fetus 3-4-47	Bulbar and spinal paralytic types. Difficulty holding body erect
20	9-21-46	26	0	10 weeks	Spontaneous incomplete abortion 9-24-46	Spinal paralytic type. Weakness of both legs 11-1-47
24	8-26-46	22	1	26 weeks	Outlet forceps extraction	Spinal paralytic type. Weakness of leg muscles, left side and back
25	8-28-46	29	3	30 weeks	Post-mortem hysterotomy 8-29-46. Baby expired 5 minutes after delivery	Bulbar type. Respiratory death.
30	8-30-46	24	1	38 weeks	Low forceps extraction	Spinal paralytic type. No residual paralysis

pirator, she had had many episodes of marked cyanosis, and on several occasions it was feared that she would not survive. Fetal heart tones were heard three days before delivery. Spontaneous onset of labor occurred at nine lunar months' gestation. After a labor of nine hours, low forceps were applied because the patient was having respiratory embarrassment. She had to be replaced in and out of the respirator several times during the delivery and repair of the episiotomy. After the delivery, the patient improved markedly. She was removed from the respirator and was transferred to a convalescent ward five days postpartum, where she continued to improve until the sixth day postpartum when she suddenly developed symptoms and signs of a pulmonary embolus and expired. Permission for autopsy was not granted.

Patient No. 25 was admitted with a diagnosis of bulbar poliomyelitis. On the day following admission, her condition was critical. She had been in a respirator more than twenty-four hours when she expired. The gestation was estimated to be at seven lunar months. The fetal heart was frequently heard up to one hour before death, at which time the patient became so cyanotic that it was considered necessary to keep her in the respirator continuously. After she had been pronounced dead by three doctors, an immediate postmortem hysterotomy was performed and the infant delivered. The fetal heart continued for five minutes after delivery, and the infant took one gasp. Its weight was 1,812 grams and the crown-heel length was 43 centimeters.

Patient No. 16 was delivered by low forceps on September 12. She was a primigravida with normal pelvic measurements who was diagnosed as

acute poliomyelitis, nonparalytic, and was considered a noninfectious patient at the time of delivery. Labor progressed normally until the late second stage when progress stopped with full dilatation of the cervix and the head at a 2+ station. Sterile vaginal examination revealed the presenting part to be the brow. The head was large despite the fact that abdominal examination had not revealed an abnormally large baby. A manual conversion to an occiput posterior position was carried out and the head delivered in this position by Tucker-McLane forceps. The extraction was difficult, but no apparent maternal injury resulted. The occipital-frontal circumference of the fetal head was 36.5 centimeters. The mother had a normal post-partum course except for relatively slow involution of the uterus, a finding noted in three poliomyelitis patients delivered at Minneapolis General Hospital.

The discharge diagnosis was nonparalytic acute poliomyelitis in seventeen patients, spinal paralytic in six patients, bulbar in five patients, and a combination of bulbar and spinal paralytic in two patients. In the series, there were six deaths. Of these, five occurred in patients with bulbar lesions, one of whom had a combination of bulbar and spinal involvement. One death occurred in a patient with spinal involvement only and was probably the result of a pulmonary embolus. This followed delivery of a macerated fetus of nine lunar months' gestation. An autopsy was carried out on only one of these patients. Death was due to respiratory failure. Autopsies were performed on the fetuses from patients No. 3 and No. 25. The spinal cords were soft but this could not be determined to be due to poliomyelitis.

Discussion

Most of the current literature dealing with the association of pregnancy and poliomyelitis seems to be concerned with these four major questions:

1. What effect has pregnancy on susceptibility to, or resistance against poliomyelitis?
2. What effect has pregnancy on the course of the disease in the poliomyelitis patient?
3. What effect has poliomyelitis on the course of the pregnancy?
4. Can the fetus contract poliomyelitis in utero from a diseased mother?

There is, apparently, a diversity of opinion as to the frequency of the coincidental occurrence of poliomyelitis and pregnancy. Berg[4] states that "in the many years in which poliomyelitis has been a problem, doctors had remarked on the small incidence in women who were pregnant" (p. 148). McGoogan[13] likewise speaks of the occurrence of poliomyelitis in pregnancy as being rare. Aycock,[3] who believes pregnant women are more susceptible to poliomyelitis than nonpregnant women, has calculated the chance coincidence of the two conditions to be less than once for every 1,000 cases of poliomyelitis. Since thirty of the 695 cases of poliomyelitis admitted to the Minneapolis General Hospital were pregnant (a ratio of approximately 43 pregnancies per 1,000 cases of poliomyelitis), it would appear that factors other than chance were operating.

TABLE III. PERCENTAGE OF PREGNANT POLIO CASES TO CASES OF POLIO IN WOMEN OF CHILD-BEARING AGE

Author	Locality	Women of Approximately Child-bearing Age	Number of Cases in Pregnancy	Percentage of Pregnant Cases Among Women of Child-bearing Age
Aycock (Vaughn)	Detroit 1939	11	3	27.3
Brahdy and Lenarsky	New York	15	3	20.0
Fox and Sennett	Milwaukee 1943	6	4	66.7
Aycock	Duluth	8	1	12.5
Aycock	Dist. of Columbia 1944	18	4	22.0
Aycock (Waaler)	Bergen, Norway 1941	18	7	30.0
Aycock	Massachusetts 1945	54	10	18.5
Baker and Baker	Mpls. Gen. Hosp. 1946	115	30	26.0
	Total	245	62	25.3

In the Detroit epidemic of 1939, Aycock[3] reports (from a personal communication from Vaughan) eleven cases of poliomyelitis in women over twenty-one years of age. Three of them (27.3 per cent) were pregnant. In the New York epidemic, as reported by Brahdy and Lenarsky,[7] fifteen patients were women over nineteen years of age; three of these (20 per cent) were pregnant. Fox and Sennett[8] summarized the above data, and added to them their own findings reported in Wisconsin in 1943: four pregnant poliomyelitis patients out of a total of six female cases (66.7 per cent). Totaling the three reports showed that 31.3 per cent of the female poliomyelitis patients in the child-bearing age were pregnant. Four additions to these reports were made by Aycock[2] in a later study: (1) Duluth, Minnesota, series, where one of eight female patients was pregnant; (2) District of Columbia, where in 1944, of

eighteen female patients twenty to forty-five years of age, four (22 per cent) were pregnant; (3) Waaler's report of twenty-three female patients over eighteen years of age (Bergen, Norway, 1941), seven of whom (30 per cent) were pregnant, and (4) Massachusetts, 1945, where ten out of fifty-four female patients between the ages of fifteen and forty-five were found to be pregnant. To these reports, we add those for the Minneapolis General Hospital during the two-month period covered by this study. Of 115 cases of poliomyelitis in women fifteen to forty-five years of age, 30 (26 per cent) were pregnant. Combining these findings with those of the above-mentioned investigators, it is found that 25.3 per cent of the women in the child-bearing age in these eight studies were pregnant. (These reports are reasonably comparable, although the definition of child-bearing age differs slightly in each report.) According to calculations based on data obtained from the Statistical Abstract of the United States Census Bureau for 1946,[16] approximately 6 per cent of the female population of child-bearing age are pregnant at any one time.* Since the percentage of pregnant women among female poliomyelitis patients of the child-bearing age (as determined in these studies) is more than four times that of pregnant women among the corresponding group of the population at large, it would appear that pregnant women are more susceptible to poliomyelitis than nonpregnant women.

Some investigators find evidence to support the conclusion that the pregnant female is somewhat more resistant to poliomyelitis during the first trimester of pregnancy. The International Committee for the Study of Infantile Paralysis[11] reports that "there is a general impression that, although the disease is likely to occur in the late months of pregnancy, it does not occur in the early months. We have met with no instances of the disease occurring in early pregnancy" (p. 416). Weaver and Steiner,[17] using pregnant cotton rats experimentally inoculated with poliomyelitis virus, found rats in the first trimester of pregnancy were more resistant than those in more advanced stages of pregnancy, but all pregnant rats were somewhat more resistant than virgin rats. Brahdy and Lenarsky[7] conclude from their study of three patients and a review of eight cases from literature, that poliomyelitis can occur in early pregnancy as well as in late. Aycock,[17] in a survey of seventy-five pregnant poliomyelitis cases from the literature and from his personal records, found 17.1 per cent of these infections to have occurred in the first trimester of pregnancy, 34.3 per cent in the second, and 48.8 per cent in the last. He expresses the belief in a later study,[2] however, that "there is no indication of a tendency of the disease to occur at any specific period of pregnancy" and that the apparent dearth of infections in early pregnancy is probably due to "discrepancy in the data." Of the thirty pregnant women with poliomyelitis at the Minneapolis General Hospital, 23.3 per cent were in the first trimester, 53.3 per cent in the second, and 23.3 per cent in the last. This would tend to support Aycock's views.

Pregnancy has little influence on the course of poliomyelitis or the extent of paralysis in the mother, according to Harmon and Hoyne.[10] McGoogan,[13] on the other hand, believes that pregnancy may be a factor in the severity and outcome of poliomyelitis, in that such complications as cystitis and respiratory paralysis are aggravated by pregnancy, and that recovery seems to occur more rapidly after its termination. Brahdy and Lenarsky[7] imply that respiratory paralysis is the only indication for the termination of pregnancy in a patient with poliomyelitis. Gillespie[9] reports a patient who improved markedly after a cesarean section was performed in a respirator. A similar patient, described by Spishakoff et al,[15] appeared to be so seriously ill that post-mortem cesarean was considered. However, after spontaneous delivery occurred, the patient's respirations improved immediately, she became afebrile within twenty-four hours, and was removed from the respirator a week later. They offer this as the only reported case of full-term pregnancy complicated by ascending poliomyelitis and respiratory paralysis. To this, we can add case No. 3 of our study, as described above, which closely resembles it. Due to the capricious nature of the disease itself, however, it is difficult to determine how much of its course can be attributed to the influence of pregnancy or to its termination. The present study showed that 20 per cent of the pregnant poliomyelitis patients expired, while 14.1 per cent of the nonpregnant female patients of child-bearing age expired. Although this is too

*This figure was computed by taking 9/12 (period of gestation) of the ratio of births during 1944 to female population fifteen to forty-five years of age for that same year.

slight a difference to warrant any conclusions as to the influence of pregnancy on the prognosis of the patient with poliomyelitis, it is, perhaps, worthy of mention.

exhausted and the maternal outlook grave. (The cases reported by these authors are tabulated in Table IV. The authors reporting the therapeutic abortion and one of the therapeutic cesarean sec-

TABLE IV. TERMINATION OF PREGNANCIES IN PREGNANT POLIO PATIENTS

Author	Total No. of Cases	Death of Mother Before Delivery	Normal Term	Low Forceps	Mid Forceps	Breech	Premature	Aborted	Cesarean	Unknown
Blair et al	6	1	3				1	1		
Brahdy and Lenarsky	3		1				1	Therapeutic 1		
Harmen and Hoyne	2		1				1			
Kleinberg and Horwitz	28		15	6	2	2		1	2	
McGoogan	3		2				1			
Fox and Sennett	3	1	1			1				
Spiskoff et al	1						1			
Gillespie	1								1	
Morrow and Luria	1		1							
Baker and Baker	30	4	8	4		1*	3	7	1	3
Total	78	6	32	10	2	4	8	10	4	3

* This infant was also premature and is listed again in the "premature" column.

Will the pregnant poliomyelitis patient go to term and if so, what are her chances for a normal delivery? The various investigators are quite well agreed on the answer to this question. Blair et al[6] found that deliveries were normal despite paralysis. Brahdy and Lenarsky[7] take the stand that uncomplicated poliomyelitis (exclusive of respiratory paralysis) is no indication for interruption of pregnancy. Harmon and Hoyne[10] conclude that "a normal issue assisted by a minimum of operative intervention which is of the same type as required in nonparalyzed gravid patients" may be expected. Kleinberg and Horwitz[12] summarize sixteen cases from the literature and thirteen hitherto unreported cases and conclude that "notwithstanding severe paralysis involving the abdominal and extremity muscles, and occurring during gestation, a normal course of pregnancy and labor, and normal offspring may be anticipated." They further state that there is the same proportion of complications and of indications for operative interference as for those who do not have poliomyelitis, and that cesarean section is not indicated because of poliomyelitis alone. McGoogan[13] states that poliomyelitis has no effect on pregnancy and that normal spontaneous delivery may be expected. Fox and Sennett[8] also observed that poliomyelitis in the mother did not hamper spontaneous delivery. Spishakoff et al,[15] on the other hand, attribute their case of premature delivery to poliomyelitis. Gillespie[9] likewise describes a case in which cesarean section was performed after a three-day labor left the patient

tions, respectively, seemed to feel that the procedures had not actually been indicated.) Our study showed that 30.4 per cent of the pregnant poliomyelitis patients aborted at periods varying from six weeks to six months. According to Allen,[1] 18 per cent of all pregnant women abort. This would seem to indicate that pregnant poliomyelitis patients have an excessive tendency to abort. Of the nineteen surviving poliomyelitis patients who did not abort, we were able to follow sixteen. Of these, twelve had normal spontaneous deliveries, or low forceps extractions at term. There were one cesarean section and three premature deliveries (one of these being a breech extraction). There was no evidence that the effects of poliomyelitis influenced the type of delivery in any of these patients, with the exception of one low forceps extraction on a patient in a respirator.

There is no convincing evidence that intrauterine transmission of poliomyelitis occurs. Weaver and Steiner[17] examined records from the literature, of six cases of alleged prenatal infection of the fetus with anterior poliomyelitis and expressed the opinion that the data did not justify such a conclusion. Bierman and Piszczek[5] report a case of poliomyelitis in an eleven-day-old infant, but acknowledge the possibility of other avenues of infection, including postnatal contact with the mother who expired on the fourth postpartum day with bulbar poliomyelitis. Fox and Sennett,[8] after examining two normal offspring from mothers with poliomyelitis and one fetus in a dead mother, concluded that poliomyelitis in the

mother did not affect the fetus. Blair et al[6] found no evidence of the infection occurring *in utero* in four infants examined by them. Brahdy and Lenarsky[7] could find no effect on the newborn

live babies had been delivered by March 15, 1947. Eight of these deliveries were spontaneous, and the infants were full-term. One was a cesarean section; two were simple low forceps extractions;

TABLE V. INFANTS BORN OF MOTHERS WHO HAVE HAD ACUTE POLIOMYELITIS DURING THE PREGNANCY

Author	Number of Infants	Normal	Died	Polio	Stillbirth	Abnormal	Unknown
Biermann and Piszczek	1			1			
Fox and Sennett	2	2					
Blair et al	5	4	1				
Brahdy and Lenarsky	2	2					
McGoogan	3	2	1 (prem.)				
Harmon and Hoyne	2	1			1 No evidence of polio		
Kleinberg and Horwitz Observed	12	12					
Kleinberg and Horwitz Literature	15	12	1 (prem.)		1 (prem.)	1 (Bilateral club feet)	
Gillespie	1		1 (prem.)				
Spiskakoff	1	1 (prem.)					
Baker and Baker	20	1 (prem.) 13	1 (prem.)		2 (prem.)	1 (Osteogenesis imperfecta)	3
Total	64	49	5	1	4	2	3

which could be attributed to poliomyelitis in the mother. According to McGoogan,[13] "intra-uterine transmission, if it occurs, is rare." He seems to imply that it can occur, but admits that the evidence is inconclusive. Harmon and Hoyne[10] also speak of it as "rare." They present one case in which inoculation of a Macacus rhesus monkey with preserved fetal spinal cord failed to produce clinical or microscopic evidence of poliomyelitis. Kleinberg and Horwitz[12] have been quoted above as believing that normal offspring may be expected from mothers who have had poliomyelitis during their pregnancy. None of the offspring of the pregnant poliomyelitis patients who make up the material of this study has shown any evidence of having acquired the infection. Autopsies on the one infant and on one of the stillborn were inconclusive as to poliomyelitis, but showed that death of the infant was due to anoxemia. There was no autopsy on the other stillborn which was a premature infant.

Summary

During the period of July 29 to September 21, 1946, 695 cases of acute anterior poliomyelitis were admitted to the Minneapolis General Hospital. Of this number, 115 were females in the child-bearing age of fifteen to forty-five years, and of these, thirty were pregnant. There were seven in the first trimester of pregnancy, seventeen in the second, and seven in the third. Fifteen one was carried out by conversion of a brow to an occiput posterior position and a low forceps extraction; one was a breech extraction of a premature infant with osteogenesis imperfecta; one was a normal spontaneous delivery of a premature infant; and one was a postmortem hysterotomy which produced an infant of seven lunar months' gestation which lived only five minutes. Seven spontaneous abortions and six deaths occurred among the thirty pregnant patients.

Conclusions

1. Acute anterior poliomyelitis occurs in all three trimesters of pregnancy. It occurs in the pregnant woman more frequently than can be attributed to mere chance.

2. In general, pregnancy has little influence on the course of poliomyelitis or the extent of paralysis.

3. There is a relatively high percentage of abortion (30.4 per cent) among pregnant patients with poliomyelitis.

4. This study produced no evidence to show that the fetus can or cannot contract poliomyelitis *in utero*.

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A REVIEW OF 174 CASES OF CANCER WITH NECROPSIES

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THIS review of 174 cancer deaths with necropsies over a five-year period from 1940 through 1944 is divided into two parts. The first section is a broad statistical study as to incidence with a comparison to national and state figures. The second part consists of a more detailed discussion with reference to the various more common sites of cancer and their signs and symptoms.

Statistical Review

The United States Census Bureau for 1944[7] revealed that 171,171 (12.1 per cent) of 1,411-338 deaths were due to cancer. In Minnesota the figures released by the Minnesota Department of Health for 1945[7] showed 27,336 deaths from all causes, with 4,096 deaths (14.9 per cent) due to cancer.

TABLE I. ADMISSION MALIGNANCY DEATH RATE

Year	Admissions*	Number of Cancer Deaths**	Necropsy Number	Malignancy Percentage
1940	6,786	27	22	.72
1941	6,805	42	36	1.10
1942	7,553	49	49	1.30
1943	8,155	40	31	.87
1944	8,590	40	36	.89
Total	37,889	198	174	.97

* Admissions exclusive of newborns.
** Deaths due to cancer without confirmation of necropsy.

At St. Luke's Hospital, Duluth, Minnesota, 0.97 per cent of all admissions (Table I) over a five-year period resulted in death by cancer. The important role which cancer deaths play in our hospitals is further illustrated by Table II in which 16.49 per cent, or one-sixth, of the necropsies performed over the five-year period were diagnosed cancer.

In Minnesota deaths from cancer in 1945,[7] among residents, showed a sex distribution of 1,942 (51.3 per cent) men and 1,843 (48.7 per cent) women. These were reversed in the nation as a whole, with 89,781 (52.4 per cent) women and 81,390 (47.6 per cent) men for the year of 1944.[7] Over a five-year period the cases diagnosed as cancer on necropsy at this hospital totaled 101

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TABLE II. PERCENTAGE OF MALIGNANCIES IN NECROPSIES

Year	Number of Autopsies	Number of Malignancies	Percentage
1940	234	22	9.4
1941	251	36	14.3
1942	185	49	26.4
1943	183	31	16.9
1944	202	36	17.8
Total	1055	174	16.49

TABLE III. SEX DISTRIBUTION OF MALIGNANCIES ON NECROPSY

Year	Number of Males	Percentage	Number of Females	Percentage
1940	10	45.5	12	54.5
1941	24	66.6	12	33.3
1942	25	51.0	24	48.9
1943	17	54.8	14	45.0
1944	25	69.4	11	30.6
Total	101	58	73	41.9

TABLE IV. CANCER DEATHS BY AGE

Age Group	Number of Malignancies	Percentage
5–10	2	1.10
11–20	3	1.70
21–30	1	.57
31–40	8	4.59
41–50	21	12.06
51–60	47	27.00
61–70	38	21.80
71–80	44	25.00
81–90	9	5.10
91–100	1	.57

(58 per cent) men and 73 (41.9 per cent) women (Table III).

The age-specific death rate per 100,000 estimated population in the United States in 1940[6] bears out the fact that cancer becomes an increasing menace from the fifth decade on. In the State of Minnesota 3,059 (80.8 per cent) of a total of 3,785 deaths from cancer among residents in 1945 occurred in the age group between forty to eighty years. In our series 150 (86 per cent) of the cancer deaths (Table IV) occurred between the ages of forty-one to eighty years. The percentage of people in the nation reaching the cancer age group, between forty-five to sixty-four years, has increased from 11.9 per cent in 1870 to 19.7 per cent in 1940 and from 3.0 per cent to 6.8 per cent in the age group of sixty-five and over dur-

TABLE V. CANCER MORTALITY IN TERMS OF ORGANS PRIMARILY AFFECTED

System	Five Year Total	Percentage
Digestive		
Esophagus	3	1.70
Stomach	27	15.50
Transverse colon	5	2.80
Ascending colon	2	1.14
Cecum	3	1.70
Descending colon	2	1.14
Sigmoid	8	4.58
Recto-sigmoid	3	1.70
Rectum	8	4.58
Liver	6	3.44
Gall bladder	3	1.70
Pancreas	10	5.60
Total	80	45.90
Reproductive		
Breast	12	6.89
Ovaries	5	2.80
Cervix	7	4.59
Uterus	5	2.80
Testes	1	.57
Total	30	17.00
Genito-urinary		
Kidney	3	1.70
Bladder	5	2.80
Prostate	18	10.33
Total	26	14.90
Respiratory		
Bronchus	10	5.60
Nasopharynx	2	1.14.
Mastoid	1	.57
Total	13	7.40
Lymphatic and Bone Marrow		
Lymphosarcoma	8	4.58
Lymphatic leukemia	4	2.29
Myelogenous leukemia	4	2.29
Hodgkins	1	.57
Multiple myeloma	2	1.14
Total	19	10.90
Nervous		
Brain	1	57
Cardiovascular		
Heart	1	.57
Endocrine		
Thyroid	1	.57
Adrenal cortex	1	.57
Miscellaneous	2	1.14

TABLE VI. MEAN AGE WITH REFERENCE TO ORGANS AND SYSTEMS

Organ or System	Mean Age in Years
Kidney	49.6
Lymphatic and bone marrow	52.3
Cervix	54.2
Ovary	54.6
Uterus	58.0
Breast	59.0
Lung	59.9
Pancreas, gall bladder, and liver	63.4
Stomach	63.5
Esophagus	64.0
Colon	66.0
Urinary bladder	71.4
Prostate	71.6

TABLE VII. TIME INTERVAL FROM ONSET OF SYMPTOMS TO DEATH

System	Time in Months
Digestive	
Esophagus and stomach	11.7
Colon and rectum	7.2
Pancreas	5.5
Gall bladder	2.0
Liver	3.5
Reproductive	
Uterus	33.1
Ovary	30.9
Breast	29.5
Cervix	20.4
Testes	3.2
Genito-urinary	
Prostate	22.5
Bladder	21.8
Kidney	4.9
Respiratory	
Bronchogenic	5.6
Lymphatic and Bone Marrow	
Multiple myeloma	34.2
Lymphosarcoma	6.5
Lymphatic leukemia	5.0
Hodgkins	4.7
Myelogenous leukemia	3.7

ing the same period of time.[5] The increase in longevity and the actual increase in population does not entirely account for the higher national incidence.

The proportion of deaths from cancer by age groups is 0.4 per cent under the age of ten, increasing to 14.7 per cent in the age group between fifty to seventy, and dropping to 4.8 per cent in the age group of ninety and over.[4] In our series the percentage varied from 1.10 per cent in the age group under ten to 27 per cent in the age group between fifty-one and sixty, and dropping to 0.57 per cent in the age group of ninety and over (Table IV).

In spite of the small number of cases, the five-year total percentage of cancer mortality at this hospital in terms of organs primarily affected (Table V) closely parallels the figures of the United States Census of 1942.[5] An attempt to correlate our figures with those of the State of Minnesota for 1945 is rather difficult owing to the difference of classification.

The percentage frequency with reference to primary sites in each sex is illustrated by Figure 1. The percentages corroborate the national sex specific cancer mortality of 1942[5] in that it is generally higher in males, except in those sites due to difference in physiology and anatomy. In our series, the percentage of malignancies of the lymphatic system and bone marrow were also higher in males. The mean age with reference to organs or systems varied from 49.6 years in cancer of the kidney to 71.6 years in cancer of the prostate (Table VI).

The time interval from the onset of symptoms

to death is tabulated in Table VII with shortest time interval being in the digestive, respiratory, and lymphatic systems and also in the bone marrow. One plausible explanation may be the as to whether emaciation is due to impaired metabolism or inanition is debatable.

The causes of anemia in malignancies can be summarized under blood loss, absorption of toxic

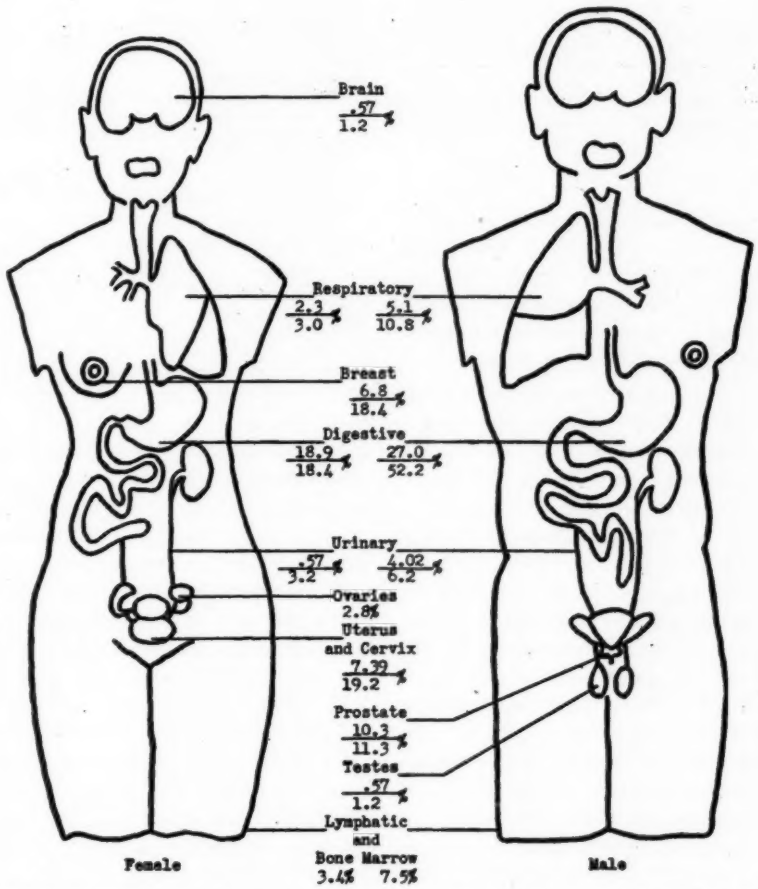

Fig. 1. The percentage frequency of primary cancer sites in each sex. The figures below the lines represent the national percentage in 1942. The figures above the lines represent the percentage in the authors' series. The diagram is from the *Minnesota Cancer Bulletin*, volume 1.

silent features of malignancies in these sites plus the comparatively large surface over which to spread.

Review of Clinical Manifestations

The systemic effect of emaciation as evidenced by weight loss of 15 pounds or more was encountered in a total of sixty-seven cases (38.5 per cent), of which forty-four (65.6 per cent) occurred with malignancies of the digestive system and twenty-three (34.3 per cent) with malignancies in other sites (Table VIII). The question

TABLE VIII. WEIGHT LOSS

Total Number	67
Percentage	38.5%
Number with gastrointestinal malignancies	44
Percentage	65.6%
Number with malignancies in other sites	23
Percentage	34.3%

products, and deficient nutrition. Approximately one-half of the cases of moderate and one-third of the cases of severe anemia occurred with

TABLE IX. ANEMIA

Moderate*	
Total Number	58
Percentage	33.3%
Number with gastrointestina malignancies	30
Percentage	51.7%
Severe**	
Total Number	12
Percentage	6.9%
Number with gastrointestinal malignancies	4
Percentage	33.3%

*Hemoglobin below 10.5 grams and red cell count below 3,500,000
**Hemoglobin below 6.5 grams and red cell count below 2,000,000

TABLE X. STOMACH—TWENTY-SEVEN CASES

Symptoms	Number	Percentage
Anorexia	24	88.0
Chronic dyspepsia	21	77.7
Nausea	19	70.0
Loss of weight	16	59.0
Vomiting	13	47.7
Achylia	9*	
Occult blood in stool	8	29.6
Anemia	8	29.6
Weakness	7	25.9
Hematemesis	5	18.5
Palpable epigastric mass	4	14.8
Dysphagia	2	7.4

*Gastric analysis done only in nine cases

TABLE XI. RIGHT HALF OF COLON—TEN CASES

Symptoms	Number	Percentage
Anemia	8	80
Loss of weight	6	60
Vomiting	4	40
Nausea	4	40
Anorexia	3	30
Fullness	3	30

malignancies of the digestive tract (Table IX). This may strengthen the theory of hidden, recurrent bleeding as a causative factor. Although albuminuria occurs in a high percentage of cancer patients, the cause is unknown and in our series occurred in forty-five (28.5 per cent) cases.

Cancer of the stomach is most deadly, causing about 25,000 deaths every year in the United States.[5] The unfortunate aspect is that 50 per cent of all gastric cancers metastasize even before the appearance of initial symptoms.[5] Thus, it becomes obvious that persistent digestive disturbances in anyone beyond forty years of age should be thoroughly investigated. Loss of appetite, belching, and perhaps mild abdominal pain may be the only signs. However, anorexia is usually one of the first symptoms, and in our series (Table X) occurred in twenty-four out of twenty-seven cases (88 per cent). Anorexia, chronic dyspepsia, nausea, loss of weight and vomiting constituted the five outstanding symptoms (Table X). Achlorhydria, occult blood in the stools, anemia, weakness, hematemesis, palpable epigastric mass and dysphagia occurred with significant frequency so as not to be overlooked as possible symptoms and signs of carcinoma of the stomach. Dysphagia may be a relatively early sign of cancer involving the cardiac end of the stomach. According to Wangensteen and associates,[2] the absence of free hydrochloric acid in the stomach may be a good screening test for detection of cancer of the stomach. Unfortunately, in our series of twenty-seven cases, gastric analysis was done only in nine cases, all of which showed an achlorhydria. Carcinoma has been known to respond to ulcer therapy and here may lie the danger of confusing a malignancy with that of peptic ulcer. The difficulties encountered in early detection of cancer of the stomach are many and well known. Even after application of all available diagnostic means at our disposal, the results are often disappointing. As Rigler states,[2] "It is easy to detect a change on x-ray examination, but the nature of such may be difficult to determine."

A large percentage of cancer of the intestines occurs in the sigmoid and rectum which in our series (Table V) constituted nineteen cases (61.0 per cent) of thirty-one cases involving the colon. It has been estimated that approximately 50,000 persons in the United States harbor cancer of the colon or rectum in the presymptomatic state.[5] The great majority (90 to 95 per cent) of cancers in the sigmoid and rectum are within easy reach of the examining finger or instruments.[5] In spite of the accessibility of these lesions for early diagnosis and the fact that they metastasize rather late, about 10 per cent of all cancer deaths annually are attributable to cancer in these locations.[5] The symptoms of fatigue, weight loss, increasing constipation, change in bowel habits, vague indigestion and anemia are all important warning signs. Cancer in the right half of the colon may give no symptoms; and, since these tumors bleed easily, the first symptoms may be those resulting from anemia.[3] In our series of ten cases of carcinoma involving the right half of the colon, anemia occurred in eight (80 per cent) (Table XI). Carcinoma of the left half of the colon usually produces colicky lower abdominal pain due to a slowly developing obstruction.[3] However, blood

TABLE XII. LEFT HALF OF COLON—TWENTY-ONE CASES

Symptom	Number	Percentage
Occult blood in stool	12	57.1
Colicky abdominal pain	11	52.3
Change in bowel habits	10	47.6
Weight loss	8	38.0
Anemia	7	33.3

TABLE XIII. PANCREAS—TEN CASES

Symptom	Number	Percentage
Epigastric pain radiating to back	7	70
Jaundice	6	60
Weight loss	6	60
Palpable tumor mass	4	40
Anemia	3	30

and mucus are commonly found in the stools. In our series (Table XII), the three outstanding symptoms in order of frequency were: occult blood in the stools (57.1 per cent), colicky abdominal pains (52.3 per cent), and change in bowel habits (47.6 per cent). Since 90 to 95 per cent of cancers in the sigmoid and rectum are within reach of the finger or instruments, the routine procedure of rectal examination will undoubtedly uncover many more early lesions.

There are usually no physical findings in the early stage of carcinoma of the pancreas.[5] The complaint of epigastric pain radiating to the back is a common early sign and occurred in seven (70 per cent) of our cases. The presence of a palpable mass is a late manifestation. The traditional symptom of painless jaundice occurred in six (60 per cent) of our cases (Table XIII). The law of Courvoisier applies here also, according to which the presence of obstructive jaundice and distention of the gall bladder is likely to be due to carcinoma. Weight loss was encountered in 50 per cent, palpable tumor mass in 40 per cent, and anemia in 30 per cent of these cases.

Early cancer of the prostate is only usually discovered as an incidental finding in routine rectal examinations.[5] Unfortunately, the cancer is usually far advanced before symptoms are distressing enough for the patient to seek medical attention. The first symptoms, though unfortunately not early, are usually frequency and burning. In our series (Table XIV) nocturia occurred in fifteen out of eighteen cases (83.3 per cent) with frequency and burning occurring in 72.2 and 55.5 per cent, respectively. The diagnosis of early cancer of the prostate by digital examination should be confirmed by microscopic studies. The failure

TABLE XIV. PROSTATE—EIGHTEEN CASES

Symptom	Number	Percentage
Nocturia	15	83.3
Frequency	13	72.2
Burning on urination	10	55.5
Dribbling on urination	9	50.0
Weight loss	7	38.8
Difficulty in starting stream	7	38.8
Anemia	5	27.7

TABLE XV. BREAST—TWELVE CASES

System	Number	Percentage
Single lump	11	91.6
Serous discharge	5	41.5
Bloody discharge	4	33.3
Nodes in axilla	4	33.3
Anemia	3	25.0
Loss of weight	3	25.0
Retraction of nipple	2	16.6
Dimpling of skin	2	16.6

to do a cystoscopic examination is often the reason for missing carcinoma of the urinary bladder. The elevation of alkaline phosphatase is nonspecific, but the additional finding of an elevated acid phosphatase above 10 King-Armstrong units establishes the diagnosis of bony metastases. In our series, only seven out of eighteen cases had an acid phosphatase determination, four of which had elevated levels ranging from 24.8 up to 205 King-Armstrong units, and all had bony metastases as evidenced by x-ray examinations.

In 1945, of the total cancer deaths, 85,000 were women and 15,000 of these died of cancer of the breast.[1] The percentage of malignancy of the breast closely parallels the full maturity of the organ, and therefore the highest incidence occurs in the age group of forty-five to fifty-five. There are many diagnostic signs of breast cancer, of which pain, discharge, lump, retraction of nipple, puckering of the skin, and palpable lymph nodes are the outstanding. Pain usually indicates a benign lesion, especially if it increases in severity at the menstrual period. However, its nature should be carefully scrutinized. Retraction of the nipple may be an early or late sign. A bloody, serous or white fluid discharge is suggestive; a single lump should always be considered cancer until proved otherwise by biopsy.

In our series (Table XV), the presence of a single lump occurred in 91.6 per cent, serous discharge in 41.5 per cent, nodes in the axilla and bloody discharge in 33.3 per cent each. The presence of anemia and weight loss occurred in 25 per cent each, with signs of retraction of the

TABLE XVI. OVARY—FIVE CASES

Symptom	Number	Percentage
Abdominal discomfort	3	60
Palpable tumor	3	60
Backache	2	40
Loss of weight	2	40
Ascites	2	40
Abnormal menstruation	2	40
Anemia	1	20

TABLE XVII. CERVIX—SEVEN CASES

Symptom	Number	Percentage
Irregular bleeding	5	71.4
Leukorrhea	4	57.1
Loss of weight	2	28.5
Anemia	1	14.2

TABLE XVIII. UTERUS—FIVE CASES

Symptom	Number	Percentage
Postmenopausal bleeding	4	80.0
Anemia	2	40.0
Loss of weight	2	40.0
Burning on urination	1	20.0
Nocturia	1	20.0
Frequency	1	20.0

nipple and dimpling of the skin in 16.6 per cent each.

Unfortunately, cancer of the ovary is symptomless in its early stage. Backache which is a rather common complaint of women occurred in 40 per cent of the cases and should arouse suspicion for a thorough examination. Abdominal discomfort and a palpable tumor mass occurred in 60 per cent each and were the two outstanding symptoms (Table XVI). Peritoneoscopy with biopsy may eventually prove of great value in the diagnosis of cancer involving many of the abdominal organs. The most reliable signs are still: (1) a palpable abdominal mass or enlargement of an ovary and (2) visible increase in the size of the abdomen with or without ascites. Unfortunately, the foregoing are late signs and may explain why ovarian cancer is not diagnosed early and is often an incidental finding during a surgical exploration of the pelvis.

A biopsy of the cervix which is usually an office procedure should make early diagnosis the rule. However, the early symptoms of irregular bleeding and leukorrhea are usually lightly regarded by women, and early diagnosis is the exception rather than the rule. In about one third of the cases, abnormal bleeding is a late symptom. Biopsy should be done routinely on all cervices showing a small erosion or cervicitis. In our series (Table XVII), irregular bleeding and leukorrhea were encountered in 71.4 and 57.1 per cent, respectively.

TABLE XIX. LUNG—TEN CASES

Symptom	Number	Percentage
Pain in chest	8	80
Blood tinged cough	6	60
Pleural exudate	6	60
Loss of weight	5	50
Wheezing	3	30
Anemia	2	20

Irregular bleeding, during or after menopause, should be considered as due to cancer of the uterus unless proven otherwise by microscopic examination. Here again, by a relatively simple procedure, we are able to make an early diagnosis. In our series (Table XVIII), post menopausal bleeding occurred in 80 per cent of the cases.

In our series, cancer of the lung accounted for ten out of 174 patients (5.6 per cent). There appears to be a definite predilection for males (Fig. 1), and whether this is due to smoking habits is debatable.[5] The most common symptom is cough which may be persistent or may occur in paroxysms and is usually associated with blood tinged, mucoid or purulent expectoration. Pain is not a constant symptom, the location depending upon the part of the pleura involved. However, in our series (Table XIX) pain in the chest occurred in eight (80 per cent) with blood-tinged cough in six (60 per cent). Pleural exudation *per se* is not a diagnostic sign of cancer and occurred in six (60 per cent) of our cases. All had examination of the pleural fluid, and four (66.6 per cent) revealed cancer cells. This brings up the efficacy of routine examination of all fluid accumulations for the presence of carcinoma cells. This procedure in the hands of an experienced pathologist is undoubtedly a reliable adjunct and often makes the diagnosis in obscure cases. The importance of x-ray examinations cannot be overemphasized. Fluoroscopy and chest films in various positions as well as at the height of inspiration and expiration is of importance.[2] A localized area of atelectasis or emphysema should make one suspicious of carcinoma. In addition, bronchoscopy and biopsy are important adjuncts.

Conclusions

1. Approximately 1 per cent of all admissions to this hospital over a five-year period resulted in death by cancer.

2. Over one-sixth of the necropsies performed over a five-year period were diagnosed cancer.

3. The sex percentage was 58 per cent men and 41.9 per cent women.

4. With reference to age groups, out of 174 cases, 12 per cent occurred in the age group forty-one to fifty, 27 per cent in fifty-one to sixty, 21.8 per cent in sixty-one to seventy, and 25 per cent in seventy-one to eighty. A total of 150 out of 174 cases (86 per cent) occurred in the age group between forty-one to eighty.

5. In terms of organs primarily affected, the digestive tract accounted for a total of 45.9 per cent; the reproductive system, 17.0 per cent; the genito-urinary system, 14.9 per cent; the lymphatic system and bone marrow, 10.9 per cent; and the respiratory system, 7.4 per cent, of which 5.6 per cent occurred in the bronchi.

6. The sex specific cancer mortality with reference to primary sites was generally higher in males, except in the reproductive system.

7. The average mean age with reference to organs varied from 49.6 years with cancer of the kidney to 71.6 years with cancer of the prostate.

8. The total average time interval in months from the onset of symptoms to death was 5.98 with cancer of the digestive tract; 5.6 in the bronchi; 10.8 in the lymphatic system and bone marrow; 16.4 in the genito-urinary system; and 29.4 in the reproductive system.

9. The systemic effect of emaciation occurred in a total of sixty-seven (38.5 per cent) of the cases, in which group forty-four (65.6 per cent) occurred with malignancies of the digestive tract.

10. Approximately one-half of the cases of moderate anemia and one-third of those with severe anemia occurred with malignancies of the digestive tract.

11. Albuminuria occurred in forty-five (25.8 per cent) of the cases.

12. The five outstanding symptoms of cancer of the stomach were: anorexia in 88 per cent, chronic dyspepsia in 77.7 per cent, nausea in 70 per cent, loss of weight in 51.8 per cent, and vomiting in 47.7 per cent.

13. Gastric analysis was done only in nine out of twenty-seven cases of cancer of the stomach, and all showed an achlorhydria.

14. In our series, 61 per cent of cancer involving the colon occurred in the sigmoid and rectum.

15. Anemia which is usually a prominent symptom of cancer of the right half of the colon occurred in 80 per cent of our cases in this half of the colon.

16. Colicky abdominal pain which is usually a prominent symptom of cancer of the left half of the colon occurred in 52.3 per cent of these cases.

17. In our series, only seven out of eighteen cases of cancer of the prostate had acid phosphatase determination, four of which showed elevated levels and evidence of bony metastases by x-ray.

18. A single lump in the breast was the outstanding finding in eleven out of twelve cases of cancer of the breast.

19. Irregular bleeding occurred in 71.4 per cent of cancer of the cervix and postmenopausal bleeding in 80 per cent of cancer of the fundus of the uterus.

20. Examination of pleural fluid for cancer cells was done on all cases of bronchogenic carcinoma with pleural effusion, and was positive in four (66.6 per cent) of the cases.

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TONSILLECTOMY AND POLIOMYELITIS

The mode of transmission and the portal of entry of the virus of poliomyelitis remain unknown. Without this knowledge we are forced to theorize on the relationship between tonsillectomy and poliomyelitis.

A statistical survey indicates that poliomyelitis is relatively infrequent following tonsillectomy. The study carried out at Manhattan Eye, Ear and Throat Hospital on 11,204 tonsillectomy patients over a seven-year period revealed but four cases of poliomyelitis following tonsillectomy. None was of the bulbar type.

The widespread alarm on the part of the public, shared by doctors in some communities, is unfounded on the basis of our statistics.

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GENERAL PRINCIPLES IN THE TREATMENT OF PEPTIC ULCER

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PEPTIC ulcer is perhaps one of the greatest obstacles in our efforts to practice medicine scientifically. It readily fits into a category occupied by hypertension and arthritis, so placed because of the cloud of confusion that is associated with them.

The little substantial information that we have has been given to us by the physiologist who, thus far, has done the most practical investigative studies. Even that is insufficient knowledge to enable the clinician to treat the individual who has a peptic ulcer with anything but symptomatic management.

Although the etiology of peptic ulcer is not known, the pathogenesis should be discussed. Konjetzny demonstrated that an ulcer begins in the mucosa and has a penetrative tendency. Mann and others have shown that the experimental ulcer in animals also tends to penetrate and is identical in pathological appearance and in behavior with peptic ulcer as seen in human beings.

It has been proved satisfactorily that the production of these ulcers is impossible unless acid gastric juice is present. Cade, Varco, Wangensteen and coworkers were able to produce typical chronic peptic ulcer in the dog and other animals by inducing a continued hypersecretion of gastric juice by the injection of a slowly absorbable mixture of histamine and beeswax. Mann produced experimental ulcer by allowing hydrochloric acid to drip continuously into the stomach.

Peptic ulcer occurs only in those portions of the human digestive tract exposed to the action of acid gastric juice, i.e., the lower esophagus, the stomach, the first and second portions of the duodenum and stomal areas after gastroenterostomy. The observation of Brown and Pemberton, that a primary ulcer of Meckel's diverticulum occurred adjacent to aberrant acid-secreting gastric mucosa, stresses the importance of acid in the production of peptic ulcer.

In 2,500 cases of peptic ulcer, Palmer was unable to find a single case of active chronic peptic ulcer in the presence of complete and permanent anacidity. The importance of acid in the duodenum, or the lack of neutralization of the duodenal acid, in the formation of ulcer is suggested indirectly by the work of Berk, Rehfuss and Thomas. They pointed out that normal people exhibit a neutralizing ability in the first part of the duodenum which is inferior to that of normal dogs. These animals are notoriously resistant to peptic duodenal ulcer.

Other phenomena as hypermotility, hyperperistalsis, hypertonicity and hypersecretion play definite roles in the pathogenesis of peptic ulcer. These conditions obviously indicate that there is an increase in activity above normal.

Although the various treatments of peptic ulcer are far from ideal, it must be remembered that the chief principle to be followed is patterned by physiological changes in secretion occurring in this condition. Many of us fail to note this. In other words, individualization of treatment based on fundamental physiological facts should be our pattern of therapy.

There should be a thorough evaluation of the patient before a method of treatment is decided upon. The x-ray appearance of the ulcer will only aid in the plan of action to be used. The individual's nervous make-up is perhaps the greatest stumbling block in the management of most cases. We all recognize the fact that tension due to fear or anxiety will cause a quiescent ulcer to manifest symptoms. This is not only a characteristic of military personnel during the past war, but it is also true of civilians. If emotional forces are capable of producing symptoms, they must be dealt with accordingly. When this control is difficult, although the ulcer is an uncomplicated one, the phrase "intractable ulcer" creeps into our thoughts, and we may prematurely consider surgery as the treatment of choice. Here a psychiatric study of the patient should be made by the physician in most cases, but occasionally it will be necessary to have him consult a psychiatrist. At this point, good doctor-patient relationship is extremely important, in that it is absolutely necessary to allay the emotional factors present.

Dietotherapy is perhaps the most valuable

Presented on January 23, 1946, at a meeting of the Oak Ridge, Anderson County, Roane County, Knox County and Campbell County Medical Societies at Oak Ridge, Tennessee. At the time of presentation Dr. Ryan was chief of the Medical Service at Oak Ridge Hospital, Oak Ridge, Tennessee.

means we have to control the acidity of gastric secretion. Food in the stomach is much more comforting to the patient with a peptic ulcer than is an alkali medicament in the greater number of cases. Here again we should evaluate the patient as to the type of diet he requires, and individualization will be necessary. Diet with rest, provided the rest can be obtained without undue worry, really is the treatment to be strived for in the management of the uncomplicated duodenal ulcer. Less than three weeks of rest is seldom beneficial. I have had under my care patients whose discomfort was exaggerated by strict adherence to the Sippy diet. These same patients improved markedly when the diet was decreased in amount or the feedings were spaced differently. In dietary management one should not overlook the caloric requirement of the individual. This principle is especially true in care subsequent to hemorrhage. Bockus lists the principles upon which dietary management may be based: The diet should contain sufficient calories, absence of gastric secretagogues, absence of cellulose and meat fiber because of the danger of trauma to the ulcer site, and the diet should be liquid or semiliquid.

Alkalies are valuable adjuncts in the treatment of the uncomplicated peptic ulcer. However, they serve only a secondary purpose. Their use is perhaps more efficient in the treatment of the ambulatory patient who is unable to neutralize the gastric contents with frequent feedings. The proponents of various alkaline substances have succeeded in placing a cloak of mystery over the underlying principles of neutralization. Some individuals will respond to sodium bicarbonate and others are more comfortable while taking colloidal aluminum hydroxide. Even in the use of alkalies good judgment is needed. A serious ill effect of large doses of soluble alkalies is the systemic alkalization which may occur. This is especially true in the older patient with arteriosclerosis and renal changes, whose function of urea clearance may be disturbed. Colloidal aluminum hydroxide is less likely to produce such changes, as there is very little absorption of the drug. Investigators have shown that it has no effect on the evacuating time of the stomach when fed in large amounts to animals. Komarov points out that aluminum hydroxide aids in diminishing peptic digestion.

The advisability of using belladonna in attempt to block out impulses over vagal routes is very questionable. Gastric motility may be diminshed by using doses large enough to produce the side effects of blurring of vision and dryness of the mouth. In the majority of cases of uncomplicated ulcer, relief of symptoms with progress in healing can be attained without it.

Mild sedation is necessary, especially in the patient who has emotional upsets. Sedation is of great value in treating the ambulatory patient, whereas in the hospital, rest and relaxation are more easily obtained. Phenobarbital is the sedative of choice and can be given in doses ranging from ¼ to 1 grain three times daily.

The use of tobacco must be stopped at the onset of treatment. Patients are more likely to have earlier relief of pain when smoking has been discontinued. In our experience here, best results were obtained when alcohol was also eliminated.

Another more recent treatment of peptic ulcer deals with the hormone, enterogastrone, which was originally isolated by Kosaka and Linn, and has been purified by Ivy and his associates. They have now reported its use in fifteen clinical cases, with good response.

The internist and the surgeon should not disagree as to the management of the individual who has an ulcer. There should be close co-operation between them, and the time at which the patient should be transferred to surgery can be determined by the internist. There should be no procrastination nor should there be any attempt to get rid of the patient prematurely because he does not respond to medical treatment.

The indications for surgical care resolve themselves into the following classification:

1. Repeated hemorrhage.
2. Perforation of an ulcer.
3. Stenosis resulting in obstruction.
4. Ulcers on the greater curvature of the stomach, and a gastric ulcer that does not disappear completely in six weeks on adequate medical treatment without a resulting scar.
5. Intractable duodenal ulcer.

The term "intractable" is widely and loosely used. There is always the question of the time at which this term can be applied to the ulcer. The ideal management consists of proper rest, diet, and alkalization over a period not less than

three months. By proper rest I mean hospitalization or satisfactory bed rest in the home. Every factor that might stimulate the ulcer symptoms should be investigated thoroughly before any thought should be given to surgical treatment. Of course there are many patients who cannot undergo strict management because of their temperament. There are also patients who will refuse to abstain from tobacco, and they will gladly submit to surgery rather than follow a strict regime. The financial question also enters into the picture. This is especially true of an individual who has a responsible position. It is difficult to explain to him why he should not have surgical treatment so that he can return to his employment at an earlier date. Many of us fail to discuss openly the possible results of operations for ulcer. An individual who has an intractable ulcer should be told of the possibilities of incomplete cure following surgical methods of treatment. Honest opinions given at this time will prevent much unnecessary explanation several years later. The patient often undergoes surgical treatment believing that his troubles will be over completely. This is not only the fault of the internist but of the surgeon as well. I have heard many surgeons tell their patients after leaving the hospital, following surgical gastric resection, that they would be able to eat everything and lead perfectly normal lives, only to have them return to the internist later for further management.

Excluding the acute emergencies, such as perforation, persistent bleeding, et cetera, the surgical treatment of peptic ulcer has now been narrowed to one popular procedure—resection of from two-thirds to three-quarters of the stomach in an attempt to diminish or to entirely abolish acid secretion. This operation has been more successful than gastroenterostomy or any other procedure used in the past. The basic principle is to abolish acid secretion. Because of the advances in anesthesia and physiological control of fluid balance, this operation carries a much lower mortality rate than it did several years ago.

Another surgical procedure that may become popular within the next few years is that of resection of the vagi in an attempt to reduce gastric secretion. Dragstedt has reported several cases with very satisfactory results. We have had under our observation here one case upon which this method of treatment was used with apparently good results. This case is not to be reported now as sufficient time has not elapsed since operation. However, the outstanding result noted so far has been the marked decrease in nocturnal gastric secretion.

The surgical treatment and the type of operation to be used should be left to the surgeon who is to operate. The internist should always bear in mind that the surgeon who does gastrointestinal surgery should be one who has had sufficient training and experience to take the responsibility of removing healthy tissue in order to bring about a good functional result. Again we may thank the physiologist for the advances he has achieved in the study of fluid balance, and the pharmacologist because he has furnished the surgeon with new anesthetics that permit better operative technique and a lower mortality.

Summary

The treatment of peptic ulcer resolves itself into a principle of "common sense." The patient should be treated as an individual and the ulcer should be remembered as being the property of that individual—not the individual the property of the ulcer. There has been little advancement in our knowledge of peptic ulcer within the past ten years. The methods and principles of treatment have remained practically at a standstill. This is, of course, the consequence of not knowing the etiology of the disease. Perhaps routine gastrointestinal studies on a series of normal individuals in the late teen ages will enable us to get some idea of the early formation of an ulcer in an individual who is susceptible to it.

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CONGENITAL DIAPHRAGM OF THE DUODENUM

Case Report with Preoperative X-Ray Studies

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CONGENITAL diaphragm of the duodenum is a developmental anomaly in which a membrane, formed by an infolding of the mucosa and submucosa, extends across the lumen of the duodenum. The diaphragm may be complete or it may present an aperture. It is to be differentiated from stenosis and atresia (Fig. 1). In the former, there is a marked local narrowing of the lumen, due to thickening and approximation of the walls. In the latter, there is a complete obliteration of the lumen, due to fusion of the walls. In reviewing the literature one finds these terms used interchangeably so that it is necessary to cover many irrelevant articles in order to be sure to include all cases of congenital diaphragm.

Those cases of a duodenal diaphragm without an aperture are, of course, instances of congenital high intestinal obstruction. Unless they are recognized and successfully operated upon, they die during the first few days of life. Those presenting small apertures in the diaphragm may have no symptoms, but they are, in fact, instances of chronic partial obstruction, and, as such, they are potential candidates for complete obstruction.

Incidence

No case is recorded in over 43,000 autopsies at the Department of Pathology, University of Minnesota. A review of the literature reveals thirty-five reported cases of congenital duodenal diaphragm. According to Krieg,[8] Robert Boyd, in 1845, was the first to report a case of obstruction of the duodenum due to a diaphragm (Table I).

Between 1845 and 1913 seventeen cases of congenital diaphragm of the duodenum were reported in the literature. None of these were operated upon, but all were discovered at autopsy. Then in 1916 Terry and Kilgore[21] operated upon a young adult in whom they found an obstruction of the duodenum and established a posterior gastroenterostomy. There was leakage from the suture line and the patient died on the fifth day. It was not until the autopsy that the true cause of the obstruction was discovered. However, this was the first reported case in which corrective surgery was attempted. Four of the next seven cases were operated upon, but it was only at the autopsy that the duodenal diaphragms were discovered.

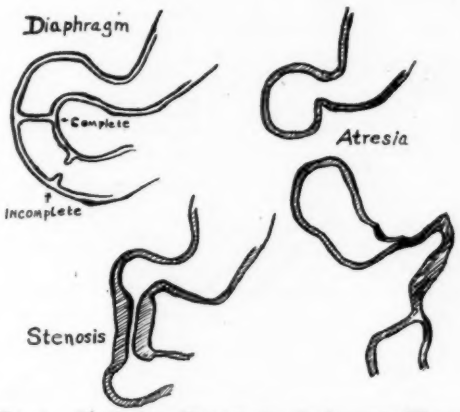


Fig. 1. Sketches to illustrate the fundamental differences between diaphragm, stenosis and atresia.

In 1925, Seidlin,[18] in describing his case, wrote, "Such a membrane, if diagnosed *intra vitam*, might be amenable to surgical treatment."

In 1933, Ladd[9] discovered a duodenal diaphragm while operating on an eight-year-old child and performed a duodeno-jejunostomy which resulted in the first surgical cure. In 1935, Morton[13] operated on his second case and was the first to remove such a diaphragm.

Krieg's case[8] had been missed by others at two previous explorations.

In Braun's second case[2] the x-ray showed an enlarged duodenum with obstruction in the third portion which was erroneously interpreted as an ileus due to mesenteric thrombosis, and no operation was done.

In Saunders and Lindner's case,[16] the true pathologic condition was missed at the first operation when the patient was fifteen months of age, but was recognized and successfully corrected at a second operation when the child was seven years of age.

Presented at a meeting of the Minneapolis Surgical Society, March 6, 1947.

TABLE I. REPORTED CASES OF CONGENITAL DUODENAL DIAPHRAGM

Author	Date	Age	Operation	Recognition	Proximal Dilation	Ring Constriction	Aperture	Result	Remarks
Boyd, R.	1845	Stillborn	None	Autopsy			None	Death	
Buchanan, G.	1861	18 mo.	None	Autopsy	Yes		2.5 mm.	Death	
Moore, N.	1884	40 yrs.	None	Autopsy			10-15 mm.	Death	Accidental death
Silcock	1885	34 yrs.	None	Autopsy			15 mm.	Death	Resembled finger of glove.
Galton, J. C. Hampneys and Power	1893	1½ days	None	Autopsy			None	Death	
Wyss, M. O.	1897	5 days	None	Autopsy			None	Death	
Shaw and Baldorf	1900	1½ days	None	Autopsy	Yes		None	Death	
Weber	1907	13 days	None	Autopsy			Small	Death	
Keith	1910	10 days	None	Autopsy			None	Death	
Keith, A.	1910	9 mo.	None	Autopsy			None (?)	Death	
Roe and Shaw	1910	Adult	None	Autopsy	Yes		5x3 mm.	Death	Diaphragm ballooned distally.
Spriggs	1911	5 days	None	Autopsy			None	Death	
Spriggs	1912	9 mo.	None	Autopsy			?	Death	
Wilkie	1912	14 days	None	Autopsy	Yes		1-3 mm.	Death	
Wilkie	1913	Adult	None	Autopsy	Yes	Yes	Yes	Death	Proximal diverticulum.
Wilkie	1913	Adult	None	Autopsy	Yes	Yes	Yes	Death	
Terry and Kilgore	1913	Adult	None	Autopsy	Yes	Yes	Yes	Death	
Schroder, C.	1916	24 yrs.	Posterior gastro-enterostomy	Obstruction recognized at operation but cause not recognized	Yes	Yes	Yes	Death on fifth day	First attempt at corrective surgery. Leakage at suture line. Real pathologic condition discovered at autopsy.
Morton, J. J. First case	1921	14 wks.	Exploratory and jejunostomy	Autopsy			3 mm.	Death	
Nagel, G.	1923	1 day	Release paraduodenal hernia	Autopsy			None	Death	
Seidlin, S.	1925	70 yrs.	Exploratory	Autopsy	Yes	No	8 mm.	Death	X-ray showed dilated stomach. At operation found intussception of stomach into espohagus.
Thorndike, A.	1925	2½ yrs.	None	Autopsy	Yes	Yes	7 mm.	Death	Septum dome-shaped. Obstruction precipitated by eating canned corn.
Garvin, J.	1927	17 days	Exploratory and jejunostomy	Autopsy			1 mm.	Death	
Cannon and Halpert	1928	5 days	None	Autopsy			None	Death	
Ladd	1929	8 yrs.	None	Autopsy	Yes		4 mm.	Death	Rupture of stomach after several enemas.
Morton, J. J. Second case	1933	8 yrs.	Duodeno-jejunostomy	At operation			Yes	Cured	
Kreig, E.	1935	5 days	Electro-desiccation	At operation			None	Cured	
Braun, H.	1936	32 yrs.	Posterior gastro enterostomy	Missed at two previous operations, discovered at third operation			8 mm.	Cured	Had operations in 1917 and 1927, and not recognized.
Braun, H.	1938	2 yrs.	None	Autopsy	Yes	?	8 mm.	Death	
Nagel, C. E.	1938	49 yrs.	None	Autopsy. X-ray revealed an obstruction in distal duodenum but cause was not recognized	Yes	?	6 mm.	Death	X-ray showed megaduodenum and stenosis in lower third of duodenum. Suspected ileus due to mesenteric thrombosis.
Saunders and Lindner	1939	1 yr.	Duodeno-jejunostomy	By finger exploration through duodenotomy at operation	Yes	?	Admitted tip of little finger	Death	No autopsy.
		15 mo.	Not noticed at first	Missed at first operation	Not recorded		Size not stated	Missed	Preoperative diagnosis was congenital stenosis of second and third portion.
	1940	7½ yrs.	Excision	X-ray predicted obstruction. Recognized at operation	Yes	Yes		Cured	At 7½ yrs., x-ray indicated obstructed second and third portion.
Brody	1940	Newborn	None	Autopsy	Yes	?	None	Death	Ruptured diverticulum of stomach.
White and Collins	1941	1 mo.	Gastro-jejunostomy	Obstruction recognized at operation but only at autopsy was true nature discovered.	Yes		Yes	Death	
Sumner and Morris	1945	5 days	Posterior gastro-enterostomy	Operation and x-ray	Probable		None	Cured	X-ray showed complete obstruction.
Nelson, W. I.	1944	26 yrs.	Duodenotomy and excision	Operation	Yes	Yes	10 mm.	Cured	Diagnosis predicted on basis of preoperative x-ray.

Of the thirty-five cases reported in the literature (Table I) twelve were operated upon. *In only six cases (8, 9, 13, 14, 16, 20) of the entire series was the true nature of the lesion discovered during life.* Of the six, only one was an adult. Five patients were cured by operation.

This paper is presented so as to call the attention of the profession again to this anomaly and to emphasize certain aids in diagnosis. In addition a case is reported herein which is believed to be the first in the literature in which preoperative x-ray studies revealed the presence of a congenital duodenal diaphragm.

Embryology

Most articles on this subject refer to Tandler's paper, published in 1900, which stated that the lumen of the duodenum became obliterated at about the fifth week of fetal life by the ingrowth of epithelial cells. He also stated that the lumen was re-established about the twelfth week by a process of vacuolization. According to his theory a diaphragm formed when a portion of the epithelial cord was not absorbed. According to Boyden[1] this explanation is erroneous. The lumen of the duodenum does not form and then become obliterated. Instead there are two rows of vacuoles which form in the region which is to become the duodenum. One row forms along the lesser curvature side and one along the greater curvature side. These vacuoles coalesce to form a lumen. Failure of complete coalescence can result in a variety of anomalies, including longitudinal or transverse septa. Transverse membranes occur most frequently in the region of the ampulla of Vater (Fig. 2).

Anatomy

The diaphragm is what its name implies, only a thin membrane stretching across the lumen of the duodenum. It varies in thickness from 0.5 mm. to 4 mm. In several instances it was stretched so as to project distalward in the lumen with its aboral surface convex. Silcock,[19] in 1885, wrote as follows in describing his case: "In the duodenum, six inches below the pylorus, is a congenital septum which barely admitted the tip of the little finger. A pouch formed of mucous and submucous tissue projects downward into the lumen of the gut and roughly may be likened in size and shape to the thumb of a glove."

In eight of the cases definite mention was made at operation or autopsy of a ring of constriction visible on the duodenum at the level of the diaphragm. In eighteen cases it was stated that the duodenum proximal to the lesion was dilated and hypertrophied. In several cases the stomach, pylorus, and proximal duodenum were dilated and hypertrophied. In a few of these a moderate relative narrowing at the pylorus gave the impression of an hour-glass stomach. Several reported that the stomach and duodenum were normal on external appearance.

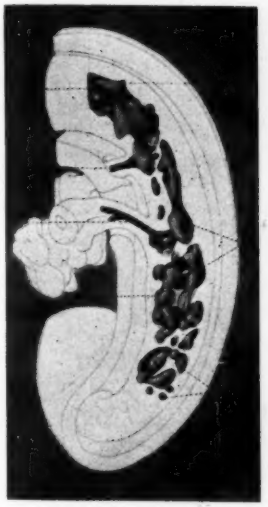


Fig. 2. Illustration from an article by R. A. Schwegler and E. A. Boyden in the *Anatomical Record*, volume 67, page 459. Note the two rows of vacuoles which are to become the duodenal lumen.

Histologically the diaphragm is made up of two layers of otherwise normal duodenal mucous membrane with some intervening submucosa. In Brody's case[8] some aberrant pancreatic tissue was found at the base and extending out between the layers of the diaphragm.

Although the membrane may be at any level of the duodenum, in the great majority of reported cases the diaphragm was found at or near the level of the ampulla of Vater. Both the common bile duct and the pancreatic duct have been reported traversing the diaphragm, and either or both ducts may empty into the bowel through either surface of the diaphragm (Fig. 3). This is to be borne in mind in planning the surgical management of such a case.

As is often the case, when one congenital anom-

aly is present, other anomalies may be present. This occurred in several of the reported cases and, by distracting the surgeon's attention, contributed to the failure to recognize the true path-

Fig. 3. Seidlin's case. Note the dome-shaped diaphragm with a central aperture, the proximal dilatation of the duodenum, and the relationship of the common bile duct to the diaphragm. *Upper sketch:* Esophagus, stomach and duodenum opened after fixation in formalin. *Lower sketch:* Duodenal lumen with septum shown from jejunal side. *Drawing in upper left corner:* Diagrammatic representation of the course of the biliary and pancreatic ducts in relation to the duodenal septum, its surfaces and orifice.

ologic condition in the duodenum. Among the associated anomalies may be mentioned such conditions as incomplete rotation, internal congenital hernia, abnormal fixation, diverticulum of the stomach, et cetera.

Clinical Manifestations

In cases of complete membrane without aperture, of course the obstruction is total. Persistent and recurrent vomiting appears in the first few days of life. Visible peristalsis and upper abdominal distention may be present. These patients all die unless the obstruction is recognized and relieved.

The age of onset and the severity of symptoms vary with the size of the aperture. These patients tolerate liquid nourishment, but begin to show obstructive symptoms when soft or solid foods are added to the diet. This is to be expected since the aperture in the group up to eight years of age did not exceed 8 millimeters (Table I) and could easily be blocked by food particles. Vegetables, with their high cellulose content, have been the most frequent cause of converting an incomplete chronic obstruction to an acute and complete obstruction. This is what occurred in Seidlin's case[18] (Fig. 3). In a few cases, acute obstructive symptoms did not appear but the nutrition was greatly impaired.

Morlock and Gray[11] stated that regardless of how long the first appearance of symptoms is delayed, these infants do not attain the development of normal children. However, in several cases there was no history of obstructive symptoms until adult life, and no mention was made of underdevelopment.

Right upper abdominal pain or discomfort was complained of by several nonobstructed patients. In a few cases the discovery of the condition was entirely accidental.

There was an equal distribution in the two sexes.

Referring to Table I, it is seen that the cases readily fall into three age groups. The first group includes fifteen infants under one month of age. Of these, eleven had no aperture in the diaphragm, while four did have a small aperture. Since complete obstruction is incompatible with life, those with an imperforate diaphragm came to be operated upon or died very early in life. Of the group under one month of age, all died except two,[13,20] both of whom were cured by operation on the fifth day of life. The second group of ten includes those from one month to eight years of age. The third group includes eleven adults.

Diagnosis

The most important factor in diagnosis is the ability to recognize the presence of an obstruction when it exists. Since the obstruction in these cases is high, there is no generalized abdominal distention. Visible peristalsis may be present in the epigastrium. If the vomitus contains bile, the obstruction is beyond the pylorus and the entrance of the common bile duct. Congenital

pyloric stenosis does not have bile in the vomitus and is also more prone to appear about the third week of life. If the vomitus contains bile and the stools are acholic, then the obstruction is likely due to a congenital anomaly involving the duodenum. If the common duct is double, then one opening may be above and the other below the diaphragm. In such a case bile could be present in the vomitus and the stools and yet the obstruction could be complete.

The actual differential diagnosis between the various extrinsic and intrinsic causes of obstruction will often have to be made at operation. According to Morlock and Gray[11] the extrinsic factors to be considered are abnormal fixation of the duodenum, persistence of the hepatico-duodenal ligament, annular pancreas, and vascular anomalies. Intrinsic factors include atresia, stenosis, and congenital diaphragm. It is believed that more cases of the latter condition will be recognized as more doctors become aware of it as a possibility.

The literature gave no accurate study of the comparative blood laboratory tests in these cases. It is assumed that they would be the findings of any high intestinal obstruction.

In a few instances x-ray studies with and without contrast material were made. In Braun's case[2] the x-ray showed an enlarged duodenum with obstruction in the third portion which was erroneously interpreted as an ileus due to mesenteric thrombosis, and no operation was done. In Saunders and Lindner's case[16] a diagnosis of obstruction in the duodenum was made by x-ray. In G. W. Nagel's case[15] the x-ray showed a dilated stomach but no lesion. White and Collins[22] recognized an obstruction to the barium in the duodenum. As far as could be determined no recorded case was found in the literature where a preoperative diagnosis of congenital duodenal diaphragm was made by x-ray studies. In the absence of obstruction the symptoms and clinical findings are not diagnostic, so that such cases would only be diagnosed by x-ray or at operation. Attention is called to the x-ray findings in the case here reported so that both roentgenologists and clinicians will be conditioned to recognize this possibility.

At operation there may be a ring of constriction about the duodenum. At first this may suggest an adhesive band, but an attempt to remove or divide the "band," reveals that the constricting ring extends deeply into and is an integral part of the wall of the duodenum at this level.

There may be dilatation and hypertrophy of the duodenum proximal to the constricting ring. The duodenum may have the general appearance of a portion of the stomach. The dilatation may also involve the pylorus and stomach. Although greatly enlarged, these parts may be flaccid and show no distention if there is no obstruction present at the time.

It is believed that these findings (a constricting ring on the duodenum, and dilatation and hypertrophy of the proximal duodenum), when present, are so suggestive as to indicate the need for a meticulous examination of the mobilized duodenum for the presence of a congenital diaphragm within the lumen. Duodenotomy may be necessary to make the diagnosis, and should be done if there is a reasonable suspicion that a diaphragm exists.

Preoperative Management

Cases with acute obstruction present the same problems as other patients with high intestinal obstruction, namely, dehydration, hypoproteinemia, loss of chlorides, et cetera. Corrective therapy should be instituted at once, but as White and Collins[22] have pointed out, if the patient is an infant, too much time cannot be spent in attempting to completely restore the body fluids and chemistry before operation.

In the absence of acute obstruction the operation can be done at a time of election, and more time can be given to preparing the patient for operation. Likewise at operation more time can be used to explore carefully for other anomalies and evaluate properly their relative clinical importance.

Management at Operation

Granted that a patient suspected of having a diaphragm in the duodenum is being operated upon, what shall the surgical procedure be? Short-circuiting operations such as gastro-jejunostomy and duodeno-jejunostomy have been employed. These procedures relieve the obstruction and at times may be the procedure of choice; however, they are not physiological. Mobilization of the duodenum, duodenotomy, and direct removal of the diaphragm is, however, the procedure which I would advocate wherever possible. Such a procedure requires a single short suture line and

entails no greater risk than one of the short-circuiting procedures.

Attention is again directed to the fact that the bile or pancreatic ducts may open onto or traverse the diaphragm. Therefore, the diaphragm should be carefully examined by palpation and by transillumination so that if a duct is found it can be preserved during the excision of the diaphragm. There is no great harm done if a duct traversing the diaphragm be severed accidentally, but care must be taken so as not to occlude the duct in suturing the raw mucosal edges. Closure of the duodenum should include one row of fine nonabsorbable sutures.

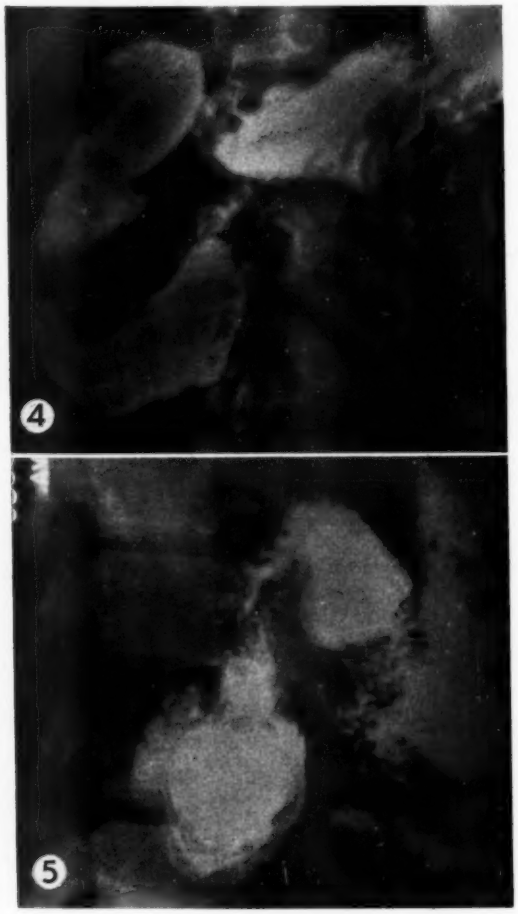


Fig. 4 *(above)* Author's case. X-ray shows narrowing in the second portion of the duodenum. Otherwise there is insufficient evidence in this film to warrant the diagnosis of duodenal diaphragm.

Fig. 5. *(below)* Author's case. Lateral view shows the third portion of the duodenum in cross section. There is a large mass of contrast material surrounded by a narrow band of barium, with a thin area of radiolucency intervening. This demonstrates that the larger accumulation is entirely within the lumen of the bowel and therefore not a diverticulum.

Case Report

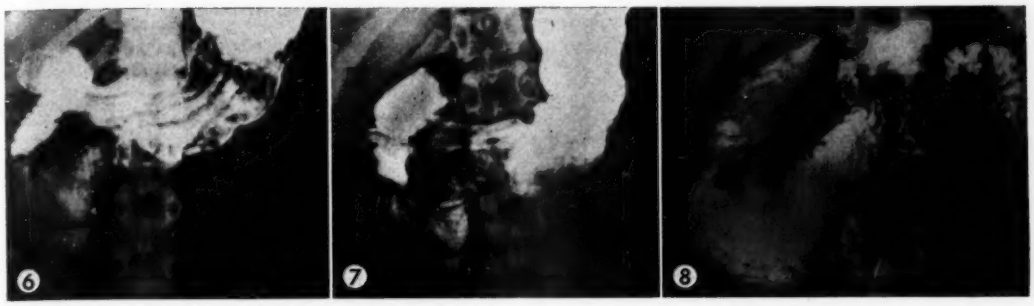
A twenty-six-year-old army nurse first noticed symptoms of her illness in March, 1944. There had been no feeding problem in infancy. A ruptured appendix had been removed in 1929. There was no history of any other gastrointestinal symptoms at any time. In 1942 she had sinusitis, joint pains, fever, and an increase in blood sedimentation rate, necessitating bed rest for six weeks.

While she was being treated in an army hospital for a severe sinus infection, she developed pain in the right flank with tenderness below the right costal margin, anteriorly and posteriorly. Pus in the urine disappeared after the administration of sulfonamides. Pain persisted, however, and she was transferred to an army general hospital where the right kidney was explored surgically on May 10, 1944. The only abnormal finding was a slight ptosis which the surgeon corrected. Pain in the right flank continued, and gradually pain in the right upper quadrant of the abdomen became more severe. In June, 1944, cholecystography indicated a normal gall bladder, and gastrointestinal x-rays showed an accumulation of barium in relation to the second and third portions of the duodeum which was diagnosed as a diverticulum.

In September, 1944, when the writer first saw her, the patient complained of persistent deep discomfort in the right upper abdomen and the right flank. There was no relation to food or meals; her appetite was fair. There was no vomiting. Bowel function was normal. She was taking as much as 90 grains of aspirin a day in order to obtain relief from the discomfort in the right upper abdomen. Physical examination at that time was negative, except for persistent tenderness in the right upper quadrant of the abdomen, with no muscle rigidity. The scars of the previous appendectomy and recent nephropexy were well healed. Laboratory studies of blood and urine were entirely normal except for blood sedimentation rate of 25 mm. per hour.

Between June and September a number of gastrointestinal x-ray studies were made (Fig. 4). The earlier diagnosis of large duodenal diverticulum was later changed to intussusception of the duodenum. A lateral film (Fig. 5) showed a profile of the third portion of the duodenum with a dense barium shadow surrounded by a narrow ring of barium (Figs. 6, 7 and 8). This proved conclusively that the accumulation was intralumenal and that we were not dealing with a diverticulum in the usual sense. The writer, having once seen a case with two diaphragms in the proximal jejunum and having read some of the literature at that time, was conditioned to include congenital diaphragm in the differential diagnosis, and went on record that the x-ray findings could be explained by a congenital diaphragm.

On September 26, 1944, the abdomen was explored. The entire duodenum and pyloric antrum of the stomach were dilated. In the second portion of the duo-



Figs. 6, 7 and 8. These views show a moderate dilatation of the entire duodenum with a zone of narrowing of the second portion of the duodenum. There is a thin area of radiolucency, within the confines of which there is an accumulation of barium. Surrounding this, mostly on the antimesenteric margin, there is a smaller amount of barium outlining the mucosal folds of the duodenum.

denum there was a fine ring-like indentation or infolding of the wall. The portion of the duodenum proximal to the ring was also thickened and redundant, so that at first sight, it resembled the pyloric antrum of the stomach. The entire descending duodenum was mobilized and turned medially to demonstrate that there was no diverticulum originating from the duodenum. A mobile thickening was palpable within the lumen of the second and third portions of the duodenum, resembling in feeling a soft, pedunclated polyp, attached in the region of the ring-like indentation previously mentioned.

The duodenum was opened by a linear incision, extending distally from the level of the constricting ring, exposing the inferior surface of a congenital diaphragm attached around the entire circumference of the duodenum at the level of the constriction (Fig. 9). Near the lateral or antimesenteric margin of the diaphragm, there was an eccentric aperture about 10 mm. in diameter. The mesial portion of the diaphragm was greatly stretched and formed a sac which extended distally within the lumen of the duodenum from its origin. The entire diaphragm and sac were covered with mucous membrane on both surfaces.

The sacculation was incised longitudinally to permit careful palpation and transillumination, and the diaphragm was excised at its base around the circumference of the lumen of the bowel. This was necessary in order to avoid injury to the common bile duct or pancreatic duct which often traverse a portion of such a diaphragm (Fig. 3). In this case, the papilla of Vater was found about one centimeter proximal to the diaphragm, on the posterior wall of the duodenum (Fig. 9). The cut edge of the diaphragm was sutured with fine chromic catgut. After closure of the duodenum by transverse suture, the lumen was adequate.

With the exception of a mild atelectasis which responded to therapy, the postoperative course was uneventful. The patient was relieved entirely of pain in the right upper quadrant and flank, and has had no recurrence of symptoms. Roentgenograms made in May, 1945, showed no abnormality of the duodenum except a slight enlargement of the cap.

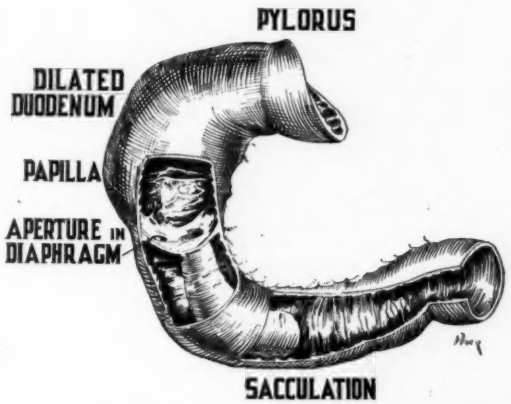


Fig. 9. Semi-diagrammatic sketch of the operative findings in the author's patient. Note the diaphragm forming a sacculation within the lumen of the duodenum, and the position of the papilla of Vater just proximal to the diaphragm. Barium or food entering the sac had no way of escape except by being ejected back into the duodenum proximal to the diaphragm and then passing through the aperture in the diaphragm.

Summary

1. Thirty-five cases of congenital diaphragm of the duodenum have been reported in the literature, only six of which were recognized during life; of these, five were cured.

2. One case is reported here of a twenty-six year-old woman in whom the x-ray studies permitted the preoperative diagnosis to be made. This patient has been cured by resection of the duodenal diaphragm.

3. Dilatation of the proximal duodenum demonstrable by x-ray has been reported in this condition by others. The x-rays of the case here reported clearly showed a congenital diaphragm forming a sacculation within the duodenum.

4. Duodenotomy and excision of the membrane is advocated rather than short-circuiting procedures.

5. The importance of making the correct diagnosis lies in the simplicity of the surgical procedure recommended and in the high mortality of untreated cases.

6. It is hoped that this demonstration of the x-ray appearance of a sacculated duodenal diaphragm will condition both surgeons and roentgenologists so that a higher percentage of cases will be recognized before or at operation.

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Discussion

TAGUE C. CHISHOLM: It was a pleasure for me to listen to Dr. Nelson's presentation of this subject. It was a scholarly presentation as well as an excellent case report. The subject is quite close to my heart, as we see more stenoses with diaphragms of the duodenum in children than in adults. By children I am referring to the newborn period because we encounter this condition not a few times within the first few days or weeks of life with intestinal obstruction. I am sure this condition must occur more frequently in adults than is suggested by reports in the literature. Dr. Nelson's suggestion for treatment by local excision and suturing the cut mucous membrane is a good one. The problem presented in infants in the newborn period is a little different. At the Children's Hospital in Boston, Ladd and Gross have reported a number of cases. In the next edition of their book, a few more will no doubt be added. They have had more success with a side-tracking procedure than by local excision. I believe that it is probably more physiologically correct to excise the diaphragm, but the frequent involvement of the pancreatic and bile duct together with collapsed distal bowel in babies increases the technical problems in patients a few days old.

Another thought on the method of embryological development of these diaphragms is that it is associated with a faulty rotation of the head of the pancreas. During development, the dorsal and ventral anlage of the pancreas rotate to the medial and final position, but sometimes the orifices of the ducts do not rotate with them and form a constriction which may contribute to formation of such diaphragms in the duodenum.

JOHN R. PAINE: I would like to know why Dr. Chisholm thinks that in infants it would be more difficult technically to do as Dr. Nelson does than to make a short-circuit operation? I think this is the most unusual diaphragm of the duodenum that I have ever seen.

TAGUE C. CHISHOLM: My reasons for stating that Dr. Nelson's procedure is more difficult in the newborn period are the following. Probably in adults there usually is a fairly wide opening in the diaphragm, enabling such patients to reach adult life. In newborn babies, only pinpoint apertures are present, and flat films of the abdomen show practically no gas going beyond the diaphragm into the distal bowel. The distal bowel virtually is in a state of atresia. The distal bowel is smaller than the diameter of a cigarette while the proximate bowel is several centimeters in diameter. With these dimensions, technically it is usually more difficult to do a satisfactory excision with avoidance of the pancreatic and bile ducts than in adults.

WALLACE I. NELSON: I have nothing to add except that I appreciate Dr. Chisholm's remarks. My experience on this didn't take me into pediatrics.

One other thing to be considered is the presence of other anomalies. I found two cases where patients who had congenital diaphragms died from ruptured diverticulum of the stomach. The cause of death was rupture of the diverticulum in the stomach, associated with obstruction of the diaphragm.

THE MINNESOTA MULTIPHASIC PERSONALITY INVENTORY

An Evaluation of Its Use in Private Practice

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WORLD WAR II has focused even more sharply the physician's attention on the widespread incidence of neurotic and psychosomatic illness. Both specialists and general practitioners realize that such cases are commonly neglected or given cursory treatment. They also realize that such cases cause more incapacitation and lost man-hours than does any other single group. Physicians agree that 50 per cent or more of their patients present psychogenic problems of varying magnitude, and that the general "aging" of the population will increase this percentage. Unfortunately, the average physician, already overburdened, rarely finds sufficient time to develop an adequate psychiatric evaluation of his patients.

In recent years, many personality tests have been devised, each aiming to evaluate the personality characteristics of the patient. These tests include the Rorschach Test,[7] the Cornell Index,[8] the Minnesota Multiphasic Personality Inventory[1-5] and several others. Each has advantages and limitations. The Rorschach Test is subjective in its analysis, time consuming, and requires the interpretation of a skilled psychologist or specially trained physician. The Cornell Index is chiefly concerned with the detection of borderline clinical states (the so-called psychosomatic disorders), and is less effective in screening hysteria, the pre-psychotic and early psychotic states. The Minnesota Multiphasic Personality Inventory has advantages not only for the psychiatrist, but for physicians in all fields of medicine: it covers a wide range of personality traits including the major psychoses; it may be graded and interpreted by the physician who has not had special training in psychiatry; it can be taken by patients of average intelligence; and it yields reproducible results.

In the course of studying this group of patients, the authors, whose practice is limited to internal medicine, have been able to investigate rather thoroughly the use of the Minnesota Multiphasic Personality Inventory as a means of evaluating further these cases. It is the purpose of this paper to describe briefly the procedure used and to illustrate the use of this test with several case studies. To date, this test has been applied to a total of 550 cases where further psychiatric evaluation seemed indicated.

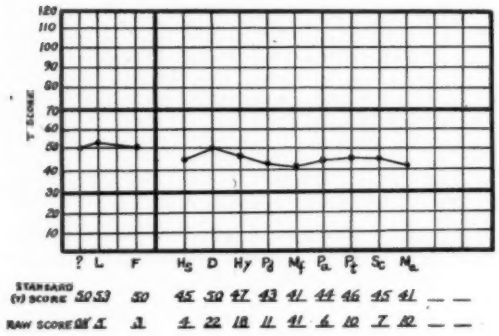
The Minnesota Multiphasic Personality Inventory (hereafter referred to in this paper as the "MMPI") was originated at the University of Minnesota seven years ago by J. C. McKinley, M.D. (Division of Nervous and Mental Diseases) and S. R. Hathaway, Ph.D. (Department of Psychology). Its authors have attempted to identify and to measure the multiple phases of the subject's personality by using a series of statements to which the testee responds "true," "false," or "don't know." It is not the purpose of this paper to describe how the inventory was developed or to discuss its statistical validity. This information has been published in detail elsewhere by the authors of the test.[1-5]

The MMPI consists of a group of 550 simply worded positive statements, usually in the first person, of which the first 366 statements are routinely used. The test has been published in two forms.* The first form consists of 550 cards, each containing a statement. The patient takes the test by sorting out the cards and filing them into one of three boxes marked "true," "false," and "can't say." We have used only the second form of the test, in which the statements appear in a bound booklet (the so-called "group form"). Using a pencil or pen, the patient fills in the appropriate squares ("true" or "false") after each number representing the corresponding statement in the booklet. This is done on a separate answer sheet. If the patient is unable to decide "true" or "false," he leaves blank the corresponding number on the answer sheet. The average patient requires about ninety minutes to complete the test. Scoring can be done by either the physician or one of his office workers, and requires eight to ten minutes. Scoring is accomplished by

George E. Fahr, M.D., Donald R. Hastings, M.D., and Starke R. Hathaway, Ph.D., rendered valuable aid in the preparation of this paper.

*The test materials for both forms of the inventory are published by The Psychological Corporation, 522 Fifth Avenue, New York 18, N. Y.

making use of nine cardboard templates, one for each personality trait tested. The "raw scores" thus obtained are listed under the appropriate headings on a convenient permanent record card



? = # LEFT BLANK
L = LIE SCORE
F = VALIDITY
H_s = HYPOCHONDRIASIS
D = DEPRESSION
Hy = HYSTERIA
P_d = PSYCHOPATHIC DEVIATE
M_f = MASCULINITY FEMININITY
P_a = PARANOIA
P_t = PSYCHASTHENIA
S_c = SCHIZOPHRENIA
M_a = HYPOMANIA

Fig. 1. A normal personality profile together with a key to the symbols used.

(size 5 x 8 in.). By making use of a series of tables in an accompanying instruction booklet, the examiner determines and records "standard scores." The standard scores are then charted graphically on the patient's record card. Figure 1 illustrates the appearance of "a normal" personality profile. The vertical co-ordinate in Figure 1 is made up of the standard score values, and the horizontal co-ordinate the personality traits evaluated. The average standard score values of each item in the profile is considered to be 50. Scores greater than 50 indicate deviation toward the abnormal, with a score of 70 taken as borderline. The first three scores on the horizontal co-ordinate beginning at the left (Fig. 1) are validating scores designed to indicate the reliability of the record. Should any one of the first three scores exceed 70, the validity of the patient's record should be questioned. Based on these criteria, the reliability of our series of profiles was approximately 90 per cent. The key to the symbols used in the test is shown in Figure 1.

Report of Cases

To illustrate the usefulness of the MMPI in private office practice, we present a series of case summaries with accompanying profiles, each case tending to point out the value of the inventory in the interpretation of a particular type of patient.

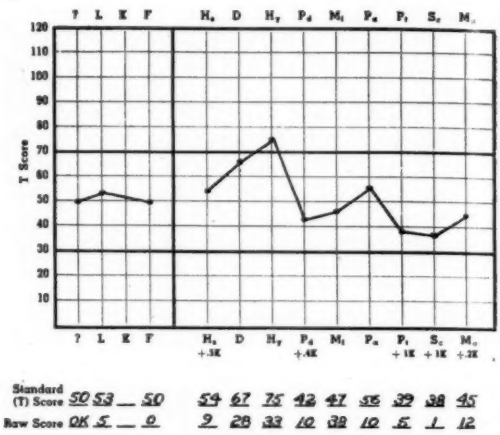


Fig. 2. (Case 1) The personality profile shows hysteria in a patient with essential hypertension and anginal syndrome.

Case 1.—Probably as important as any type of psychogenic problem seen by the practitioner is that of a patient with a definite pathologic condition (such as cardiovascular or gastrointestinal disease) in whom the symptoms are multiplied or accentuated by an added neurosis.

A married woman, aged forty-seven, was first seen on December 14, 1944. At that time her complaints included nervousness, a chronic nonproductive cough, fatigue, frontal headaches, and urinary frequency. Her past history included pulmonary tuberculosis in 1929, requiring eight months of bed rest, appendectomy in 1932, cholecystectomy in 1937, a right nephrectomy in 1940 because of hydronephrosis secondary to a kidney stone, and hysterectomy in 1943 for myomata with hemorrhage. Physical examination at that time showed a blood pressure of 210 mm. Hg systolic, 120 mm. Hg diastolic. X-ray studies showed definite left ventricular enlargement and healed fibroid tuberculosis of the right upper lobe and of the left apex. An electrocardiogram showed only left axis deviation. The pelvic floor was moderately relaxed. Sputum examinations and gastric washings for guinea pig inoculation were all negative for tuberculosis. The blood Wassermann reaction was negative. The impression at that time was one of old healed fibroid tuberculosis of the lung and essential hypertension. During November, 1946, following a period of emotional stress and anxiety over family problems, the patient developed several attacks characterized by syncope, marked agitation, fear of suffocation, and precordial pain. A series of electrocardiograms showed left axis deviation but no other significant changes over previous tracings. There were no measureable changes in the patient's previous cardiac status.

An MMPI was scored by the patient on January 14, 1947 (Fig. 2). This clearly showed hysteria (score 75) and a tendency toward symptomatic depression (score 68). The patient was reassured regarding her cardiovascular status, and the functional problem of hysteria was explained to her. The relationship was pointed out to her between her personal problems at home and her resultant anxiety and hysteria. The patient developed relatively good insight, and when she was seen on February 11 and again on April 1, 1947, she had been doing very well and had had no further attacks.

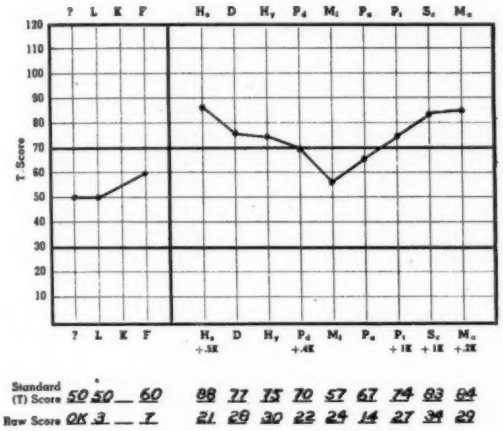


Fig. 3. (Case 2) A grossly abnormal personality curve in a young patient complaining of chronic backache.

Case 2.—By far the most frequently encountered situation is that of a patient with multiple complaints for which no organic basis can be found after a careful physical examination and appropriate laboratory and x-ray studies. Aside from an apparent hypochondriasis, other factors in the personality may escape the physician's attention. In such cases, the patient's MMPI profile may reveal valuable information which can then be used as a guide to further interview.

A boy, seventeen years old, was referred on February 5, 1947, for an evaluation of a chronic back complaint. He complained of "locking and catching" of the lower back and other vague symptoms referable to the entire spine. These symptoms began two years ago after the patient sustained a back strain while lifting a heavy object. He reported that his father had always had recurrent backaches. A previous diagnosis of spinal injury with subsequent manipulative treatment had been given by a nonmedical practitioner. Examination of this patient showed a tall, asthenic type of individual in whom no abnormalities of a physical nature could be found after a complete physical and neurologic examination and after pertinent x-ray and laboratory studies. An orthopedist, in consultation, confirmed the absence of physical findings in this patient. It was felt that this patient's symptoms were on a psychogenic basis, and the patient was asked to take an MMPI test.

The curve shown in Figure 3 indicated that the patient was not only suffering from hypochondriasis, but was hysterical and depressed. Because of the unexpected high scores for schizophrenia (score 83) and for hypomania (score 84), both of which were verified on subsequent interview, this patient was referred to a psychiatrist for treatment.

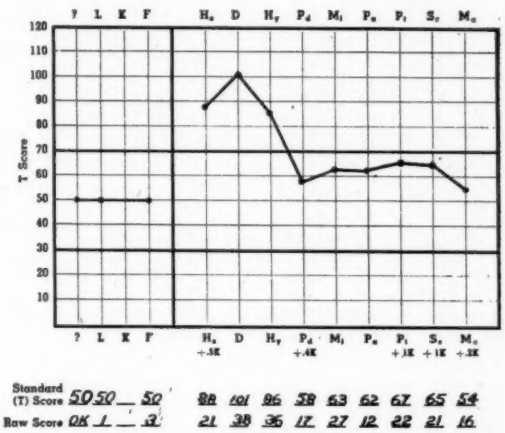


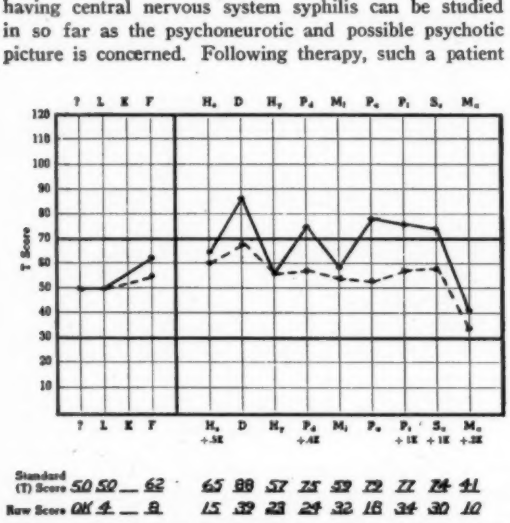
Fig. 4. (Case 3) A patient's personality profile which shows marked depression. The symptom was not obvious clinically.

Case 3.—On occasion an obviously neurotic patient is seen with excessive fatigue and multiple complaints but whose general affect is not that of depression. Such patients may actually be severly depressed (so-called "similing depression") and may be contemplating suicide. Not infrequently a routine history fails to elicit a state of depression which the MMPI may make obvious.

A thirty-eight-year-old man, a college graduate, was seen for the first time on May 6, 1946. His complaints were those of fatigue, nervousness, and palpitation. He was decidedly underweight and was troubled with what he called a "strain of the right groin." A complete physical examination and laboratory work were negative. He was placed on a high caloric diet and was advised to take additional periods of rest. He was seen again about eight months later on January 21, 1947. He had failed to gain weight, and showed no general improvement. The patient took an MMPI test (Fig. 4) at this time. A marked depression (score 101), which had been overlooked entirely clinically, was evident.

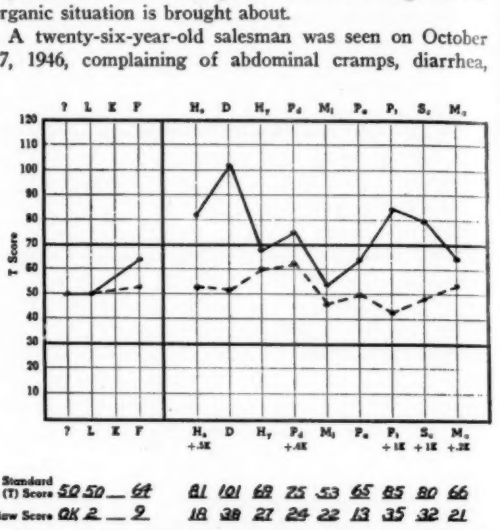
However, on questioning this patient in more detail, the depression became very apparent and was freely admitted. It may be further pointed out that this patient's MMPI record shows the "neurotic triad" of hypochondriasis, hysteria, and symptomatic depression which has been encountered frequently in other patients. This patient was referred to a psychiatrist for intensive psychotherapy. The psychiatrist has since reported considerable improvement in the patient's condition.

Case 4.—The "Test-Retest" technique has been used frequently for various reasons. For example, a patient having central nervous system syphilis can be studied in so far as the psychoneurotic and possible psychotic picture is concerned. Following therapy, such a patient



Standard (T) Score	50	50	62	65	88	57	75	59	72	77	74	41
Raw Score	QK 4		8	15	39	23	24	32	18	34	30	10

Fig. 5. (Case 4) The personality profile of a patient with paresis, prior to malaria therapy (solid-line curve) and two months after malaria therapy (broken-line curve).



Standard (T) Score	50	50	64	81	101	69	75	53	65	85	80	66
Raw Score	QK 2		9	18	38	27	24	22	13	35	32	21

Fig. 6. (Case 5) The personality profile of a patient with regional ileitis, prior to surgical treatment (solid-line curve) and after operation (broken-line curve).

can be rechecked with an MMPI test and any changes in the personality makeup noted. Thus the physician is aided in evaluating the efficacy of therapy.

A forty-year-old housewife had asymptomatic paresis. She had received a two-year course of bismuth and mapharsen and had received 5,000,000 units of penicillin. Subsequently she had been given a total of 100 grams of tryparsamide. She was seen on October 8, 1946, at which time a neurologic examination was negative. A short time before she had been seen by a neuropsychiatrist and was pronounced normal except for a moderately severe anxiety state. Her symptoms and complaints at this time were largely those of depression and anxiety. An MMPI test was administered to the patient.

The profile (Fig. 5, solid-line curve) showed a high score of 88 for depression, a tendency toward psychopathic deviation, together with the picture of paranoid, schizoid, and psychasthenic traits. In view of the patient's symptoms and the findings on the MMPI test, a course of induced malarial fever was decided upon. The patient was inoculated with malaria and subsequently experienced fourteen paroxysms of fever in excess of 103 degrees. Two months after completion of the fever therapy, the patient was seen again. At this time she stated that she felt much improved both physically and mentally. The MMPI test was repeated and it showed an essentially normal profile (Fig. 5, broken-line curve) save for a borderline tendency to depression. The psychotic features in the patient's personality were no longer evident in the MMPI profile.

Case 5.—A second example of the "Test-Retest" technique is that of testing before and after operation in a patient with organic disease complicated by a definite emotional problem. It is instructive to note the marked psychic relief in such a patient after a change in the organic situation is brought about.

A twenty-six-year-old salesman was seen on October 17, 1946, complaining of abdominal cramps, diarrhea, and low-grade temperature elevations over a year's time. Physical examination and x-ray studies of the gastrointestinal tract revealed a classic picture of progressive regional ileitis with a palpable mass in the right lower quadrant. The patient was an overly conscientious, worrisome type of individual. He became extremely apprehensive when the situation was explained and operation advised. Prior to surgical treatment, the patient was asked to take an MMPI test (Fig. 6, solid-line curve).

The profile before treatment showed a score of 101 for depression, a score of 80 for hypochondriasis, together with psychasthenic and schizoid tendencies of a moderate degree. A resection of the lower ileum and part of the cecum was successfully carried out two days later, and the postoperative course was uneventful. However, during his hospital stay, special precautions were used to avoid all possible emotional trauma. The patient was carefully followed, and when seen again on February 3, 1947, he stated he felt well, had gained weight, and his physical and mental symptoms had all but disappeared. The MMPI test was repeated at this time (Fig. 6, broken-line curve) and it showed an entirely normal profile.

Case 6.—The group of chronic alcoholics presents a problem in elevation. The differentiation between a "depressed" drinker and one who has an underlying psychopathic personality appears to be important.

A thirty-six-year-old man was first seen on February 25, 1947. He complained of intermittent localized precordial pain, marked tenseness, and nervousness. The patient freely admitted being an alcoholic of long standing. He had been known to disappear completely

from home periodically. He had been a member of Alcoholics Anonymous for a period of six months but had given up the program. He had been successful in business, but would always "crack up" because of his alcohol habit. Further history revealed that the patient had been divorced and had remarried. His father had been a chronic alcoholic and was separated from the patient's mother. His mother had remarried. There was considerable hostility between the patient and both his mother and his stepfather. Physical examination and laboratory studies were normal. An electrocardiogram was negative. However the patient showed such motor overactivity as to suggest hypomania.

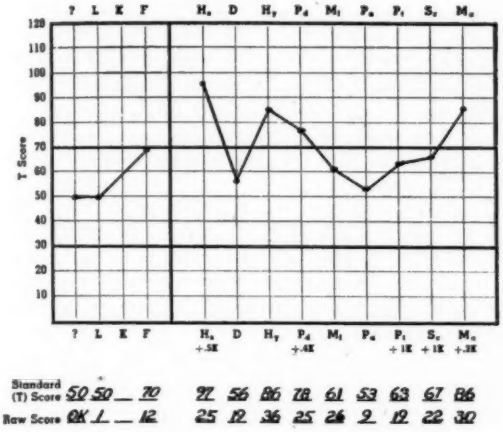


Fig. 7. (Case 6) The personality profile of a chronic alcoholic shows an underlying psychopathic deviation.

The MMPI (Fig. 7) showed not only hysteria (score 86), hypochondriasis (score 97), but also a definite indication of psychopathic deviation ("psychopathic personality") (score 78) together with the anticipated hypomania (86). The patient was referred to a psychiatrist. He subsequently has rejoined the "AA" program.

Case 7.—On occasion, the physician is consulted by a patient who has "made the rounds" of many practitioners. That the patient seems to be a bit "odd" may be obvious, but the possibility of there being an underlying major psychiatric disorder is not always immediately evident.

The patient may be treated symptomatically, and the true fundamental condition could be overlooked. An MMPI could be quickly administered, and this in turn might clarify the problem in such a case.

A thirty-five-year-old saleslady was first seen on November 8, 1946, as a hospital patient. Her complaints were vague and multiple. She was troubled with backaches, indigestion, constipation, restlessness, and marked insomnia. She admitted the frequent use of sedative drugs. Her past history was significant. About eighteen months previously, she had fallen at her place of employment and had suffered a back injury. Much litigation had followed. She had been attended by no less than a dozen physicians in another city over a period of a year and a half, chiefly for complaints about the back, and for nervousness and insomnia. Apparently the possibility of a major psychiatric disorder had not been seriously entertained by the attending physicians. At this time, a complete physical examination, together with x-ray and laboratory studies, was negative, save for a transient glycosuria but with a normal fasting blood sugar. The patient was greatly agitated, depressed, and showed a ready tendency to weep. Careful questioning, together with an interview of the relatives, disclosed paranoid delusions, mendacious tendencies, and possible drug addiction. The patient was asked to take the MMPI test (Fig. 8); this she did without undue urging.

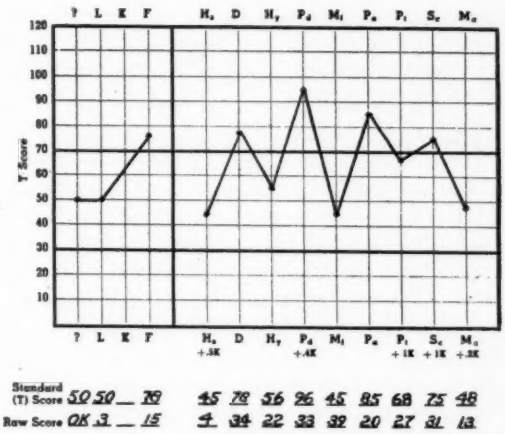


Fig. 8. (Case 7) The personality profile of a woman with a major psychosis which had been previously overlooked.

Although the reliability of the test was borderline, it readily confirmed the clinical impressions by showing depression (score 78), psychopathic deviation (score 96), paranoia (score 85), and schizophrenia (score 75). The patient is now under the care of a psychiatrist in a private sanitarium.

Comment

The Minnesota Multiphasic Personaltiy Inventory has proved to be a valuable aid in identifying and measuring personality deviations. Although the need for somatic treatment of the patient may be perfectly obvious, the need for psychiatric therapy is not always so apparent. Through the use of such a test, the physician is better able to know the relative needs of the patient for psychotherapy. Thus by making use of the balanced approach to the patient's problems, the physician is able to secure results. Oftentimes the test results will aid in the decision as to the need for referral of the patient to a psychiatrist.

Certain patients seem to derive benefit by

merely going through the mechanics of taking the test. The finished profile can be shown to selected patients. The problem of explaining to the patient the relationship between symptoms and personality can be placed on a more concrete basis. Patients are often relieved to see that their scores are on the right-hand side of the profile (the major psychoses) are within normal limits.

It cannot be too strongly stressed that one must not go ahead on score findings alone. A complete physical examination together with the necessary laboratory aids is obviously important. The patient's background, from both a hereditary and a constitutional standpoint, must be considered. One must gain an impression of the patient's environment and of the patient's reaction to that environment. The careful elicitation of the medical and psychosomatic history is still of first importance. There is no shortcut for these time-consuming procedures.

As has been indicated, the booklet form of the inventory has been used exclusively by the authors of this paper, largely because of the greater ease of administration and scoring. The authors of the inventory point out that "for college, high school, or professional people, who are used to reading and writing, the results obtained by use of the booklet form are probably almost identical with those of the card form."[6] They strongly urge the use of the card form in testing older persons, disturbed or hospitalized patients, or those of low educational or intelligence levels.

For the most part, patients have no objection to taking the test when it is explained to them that it is merely a measurement of personality traits, that it is not a mental or intelligence test, and that the examiner is not interested in the answers to individual questions. While taking the test, the patient should be comfortably seated and should be alone if possible.

Summary

1. The Minnesota Multiphasic Personality Inventory has been administered by the authors to 550 patients selected from an internal medical practice.

2. The technique of giving and scoring the inventory is described in detail.

3. Seven case histories with accompanying profiles are included as a means of illustrating the use of the procedure.

4. The advantages of this procedure as a means of evaluating the psychogenic aspect of the patient's illness are discussed.

5. It is to be re-emphasized that this inventory is designed to supplement and not to replace a careful physical examination, laboratory workup, and a rather detailed medical and psychosomatic history.

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(Continued from Page 734)

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RECONSTRUCTION OF THE EXTRAHEPATIC BILE DUCT

A Modification of the Allen Method

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GIVEN a patient with a history of a previous cholecystectomy, recurrent or persistent attacks of cholangitis or jaundice, the diagnosis of stricture of the common bile duct should be considered. All surgeons agree that the best way to prevent these strictures is care in the performance of cholecystectomy, so that the extrahepatic bile duct is not injured.

In the treatment of strictures of the common bile duct, most surgeons try to anastomose the two cut ends of the common bile duct over a rubber T-tube. The use of vitallium or lucite tubes has to date provided no special advantage over the rubber tube. If the above procedure is not possible, due to difficulty in locating the distal portion of the duct or bringing the ends of the ducts together, a choledochoduodenostomy or choledochojejunostomy (preferably the latter) is usually performed.

In 1945, Allen described a method of anastamosing the open distal end of the transected jejunum to the liver around a tube placed in the short segment of the hepatic duct in the liver sulcus. The jejunum is transected approximately 30 cm. from the ligament of Treitz, and the intestinal continuity is re-established by implanting the proximal segment of the jejunum into the distal segment after the method of Roux. This results in a mechanical arrangement whereby the intestinal current is directed away from the liver. Cotton or silk sutures hold the end of the jejunum securely in the liver sulcus since the scar tissue around the duct opening is very firm and reliable. By inverting the end of the jejunum for a distance of 1.5 cm., two surfaces are placed in apposition which theoretically, at least, have healing properties. The use of the bell end of the rubber catheter is to lead all bile through such a tube and thus produce a water tight anastomosis. By making a vent in that segment of the catheter remaining for a time within the lumen of the gut, a complete external fistula can be prevented for as long as the catheter is left in place. The majority of tubes were removed at the end of twenty-one days.

The first patient treated by the author by Allen's method developed signs of cholangitis three days after operation, which subsided upon withdrawing the catheter on the seventh postoperative day. In Allen's own series three patients had one or two mild, transient episodes of pain, jaundice, chills and fever. At best, a rubber tube acts as an irritant in the bile duct, and it may be questioned if removing such a tube at the end of twenty-one days (or a longer interval) does much to prevent further stricture.

Accordingly, the following modification was used in the treatment of the next two patients with stricture of the common duct.

1. The cut end of the distal jejunum was anastamosed to the capsule of the liver around the proximal end of the common duct to act as a funnel to receive the bile.

2. No rubber tube was used in making the anastomosis.

The patients were explored through a right subcostal incision. In both instances the proximal end of the duct was a bulbous segment flush with the liver substance. This finding is not unusual in the more complete strictures occurring high in the common duct. Also, the amount of fibroserositis on the capsule of the liver in the region of the upper end of the duct is considerable and lends itself admirably for the placement of sutures. The cut distal end of the jejunum was sutured to the liver so as to form a funnel or cup over the upper end of the common duct. No rubber tubing was placed in the duct, as it was felt that even though this dilated duct should contract somewhat, there still would be no obstruction to the flow of bile. Interrupted sutures of No. 000 silk were used to make the anastmosis. The cut end of the jejunum was inverted by a mattress suture, so there was a small serosal cuff inside the lumen. Only two rows of silk sutures were used to make the anastamosis. A penrose drain was left in the subhepatic space of Morrison and brought out through a stab wound inferior to the incision. This was removed on the eighth postoperative day.

These two patients have been followed eight months and one year respectively since operation and have been well. In neither have there been jaundice or symptoms suggestive of cholangitis.

Summary

A modification of the Allen method for reconstruction of the common bile duct is presented. The cut end of the jejunum is sutured to the liver capsule to form a funnel over the upper end of the common duct. No tubes are used in making the anastamosis. Two patients so treated have been well eight months and one year since operation.

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Probably no greater mental trauma is ever inflicted by a physician than when he first tells a patient that he or she has tuberculosis. Material and social problems combined with the psychological problems of separation from family, complete change of living routine, sudden cessation of all activity, ignorance of the disease and what it will mean to him and an unknown future is likely to create in the patient a mental turmoil which is a known detriment to his eventual recovery and return to a useful life.—C. J. STRINGER, *Hospitals,* (Aug.) 1946.

CLINICAL-PATHOLOGICAL CONFERENCE

PARATHYROID ADENOMA

A Diagnostic Case Study

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DR. F. H. MAGNEY: This fifty-one-year-old white female (Case No. 30757) was first admitted to this hospital on July 21, 1939, for a trigeminal neuralgia on the left side which was somewhat relieved by an alcohol injection. Shortly thereafter she underwent an operation on the Gasserian ganglion at the Mayo Clinic where, in addition, a cystic lesion of the right os calcis was curetted and a diagnosis of a giant cell tumor was made. The cyst was packed with bone chips from the left tibia.

The patient was readmitted on October 16, 1941, with a history of having been well since the operation two years before, except for a loss of sensation on the left side of the face. At this time she had noted intermittent pain for the past three months in the posterior aspect of the right lower thigh, especially when bending the knee. There had also been some occasional pain in the right heel. On the day of admission she stumbled down a step, falling and landing on the right knee. Her physical examination was essentially normal except for muscle spasm and swelling above the right knee. X-ray examination revealed a fracture of the lower end of the right femur with angulation, and at the same time a cystic lesion suggestive of a giant cell tumor of the bone was discovered at the site of the fracture. The patient was treated by extension, manipulation, and application of a plaster cast.

The chief complaint on the third admission (August 9, 1946) was a dull continuous pain in the left knee since the spring of that year. It had been getting progressively worse and was aggravated by weight bearing, but not relieved by rest. X-ray examination at this time revealed small calculi in the right kidney and areas of decreased density throughout the lumbar spine, pelvis, and ribs with cystic areas in the right ninth rib in the anterior axillary line and the left tenth rib in its posterior portion. There was also a cystic area in the left patella (Fig. 1), in the superior ramus of the right pubic bone, and in the left acetabulum. The alkaline phosphatase was 27.8 King-Armstrong units. The left patella was excised with the aid of Dr. M. H. Tibbetts. A diagnosis of benign giant cell tumor or osteitis fibrosa cystica was made by Dr. A. H. Wells who recommended serum calcium and phosphorus determinations to rule out hyperparathyroidism. Two serum calcium determinations revealed 15.02 and 16.62 mg. per 100 c.c., respectively. The serum phosphorus was normal. Apparently because of the many previous surgical procedures, including

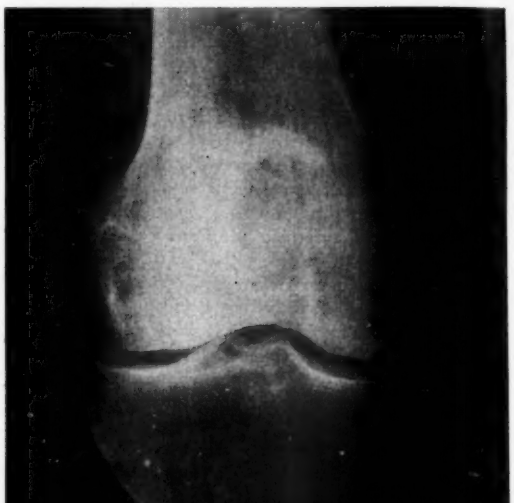

Fig. 1. Cyst in patella.

(1) tonsillectomy and adenoidectomy, (2) appendectomy, (3) perineorrhaphy, (4) drainage of a breast abscess, (5) hysterectomy, (6) resection of the Gasserian ganglion on the left side, (7) curettement of the right os calcis for supposedly a giant cell tumor and (8) treatment for a pathologic fracture of the lower end of the right femur, the patient refused an exploration for a parathyroid adenoma.

She was readmitted to this hospital for the fourth time on March 21, 1947. A parathyroid adenoma, the size of a large olive, was removed from the left superior parathyroid gland. Gross examination revealed an encapsulated mass measuring 3.5 by 2.5 by 1.7 cm. The cut surface had patchy yellowish gray mottling with an area of cystic degeneration and hemorrhage measuring 2 by 1.5 by 1.4 cm. (Fig. 2). Microscopically the tumor was encapsuplated and was made up of solid masses and cords of rather large, uniformly shaped epithelial cells with small rounded nuclei and abundance of clear cytoplasm with a well defined outer wall (Fig. 3). There was no evidence of malignancy and a diagnosis of parathyroid adenoma was made.

From the Department of Pathology, St. Luke's Hospital, Duluth, Minn., Arthur H. Wells, M.D., Pathologist.

Fig. 2. Sectioned adenoma of parathyroid.

Following surgery, symptoms suggestive of tetany were relieved by the intravenous use of calcium. Postoperatively, the serum phosphorous was 2.61 mg. per 100 c.c. and the serum calcium on two occasions was 7.6 and 6.5 mg. per 100 c.c.

Incidence

DR. H. H. JOFFE: The alertness of the profession in recognizing the symptoms of hyperparathyroidism is the major reason for the increase in frequency of the disease. In recent collective review[23] 96.3 per cent of the twenty-seven reported cases in the literature between 1903 to 1925 were diagnosed at autopsy examinations, as compared to 3.7 per cent diagnosed at operations. During the period 1936 to 1945, of the 174 cases reported, 87.4 per cent were diagnosed at operations and only 12.6 per cent at necropsy examinations. The increasing diagnostic accurracy is further exemplified by the fact that twenty-four cases had been proved at operations at the Mayo Clinic from September 30, 1942, to January 30, 1945, in contrast to fourteen cases observed during the preceding fourteen years.

Norris,[23] in reviewing 322 cases of parathyroid adenomas reported in the literature, found that the location was specified in only 251 cases. The right side of the neck accounted for 132 (52.6 per cent) and the left side for 119 (47.4 per cent). The more specific location was defined in only 197 cases, with 42.7 per cent occurring in the right lower gland and 41.1 per cent in the left lower gland. The right upper and left upper glands accounted for 9.1 and 7.1 per cent respectively. Single adenomas in aberrant positions were recorded in thirty (10.7 per cent) of 281 cases, with nineteen (63.3 per cent) occurring in the mediastinum, nine (30 per cent) within the thyroid gland and two (6.7 per cent) behind the esophagus. Of 322 cases, more than one adenoma was found in twenty (6.2 per cent) of cases.

The age group between thirty to sixty years accounted for 70 per cent of 316 tabulated cases.[23] The incidence was found to be 3 to 1 in women for single adenomas and 4 to 1 in the group of multiple adenomas. The maximum incidence in men occurred a decade earlier than in women. The latter are divided into two phases which extended through and correspond to the child-bearing period, reaching a peak at forty-five years of age.

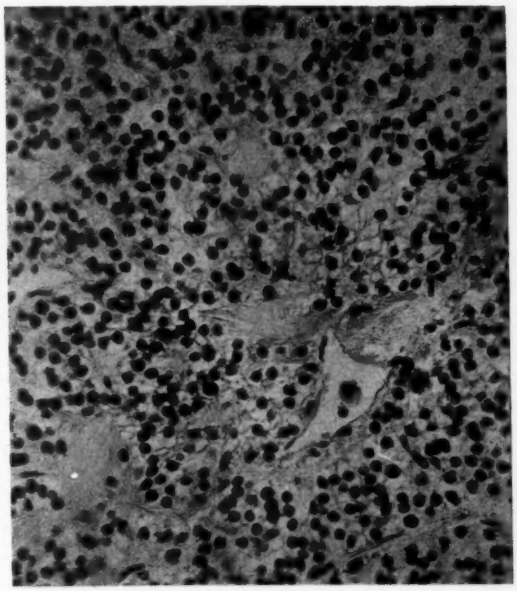

Fig. 3. High power view of parathyroid adenoma illustrating the water-clear type of cell.

Pathologic Physiology

The parathyroid hormone acts to increase the excretion of calcium, and if insufficient amount of calcium is being absorbed from the intestines, or if the output is greater than the intake, the chief reservoirs of calcium, namely the bones, are depleted.[23,30] Why generalized osteoporosis predominates in some patients and osteitis fibrosa cystica is most prominent in others is not clearly understood, but it has been postulated that the latter apparently develops in those in whom loss of calcium is more rapid.[23]

The terminal results of hyperparathyroidism are well known, but the mode of action still remains one of conjecture. At present the mechanism of action is thought to be initiated only by chemical or hormonal stimuli.[27] Prolonged stimulation of the sympathetic nerves to the glands failed to produce any change in the blood calcium.[27] The endocrine relationship to the pituitary gland is open to question. However, Perlman[25] reported a dog having an atypical eosinophilic adenoma of the pituitary gland and at postmortem examination was found to have a coincidental adenomatous hyperplasia of the parathyroid and severe chronic nephritis, together with fibrous osteopathy without brown cysts.

Collip[23,27] feels that the chief action of the parathyroid hormone is directly on solution of calcium salts from bone, while Albright[3,23,27] contends that its chief action is in promoting the renal excretion of phosphate. Recent experiments show that the hormone may act on both simultaneously.[27]

The parathyroids regulate the level of blood calcium,

determine the rate of movement from the great calcium deposits, the bones, into the blood stream and tissues, and thence out into the urine.[8] Injection of parathormone causes excretion of phosphorous and calcium in the urine which is usually followed by an increase in the blood calcium with removal of calcium from the bones.[6] Collip showed that excess doses of parathormone in dogs resulted in death in a few days and was preceded by anuria and retention of nitrogenous products.[8] Hueper showed that such dogs dying of acute parathyroid poisoning had calcium deposits in the thyroid gland, mucous membrane of the stomach, lungs, and kidney.[3] It is, therefore, felt that the kidney lesions are only a part of a more generalized process.

The calcium is precipitated out as phosphate salt in alkaline urine or as calcium oxalate in acid urine. Calculi may form in any part of the urinary tract from the renal tubules to the bladder. Calcium may also be deposited in the renal parenchyma as well as the lungs and arteries. With progressive renal calcification or nephritis due to ascending sepsis, the kidney fails to excrete the excess calcium with which it is burdened by the overactive gland. The excess is excreted by the large bowel and the blood level of calcium remains as before.[23] Retention of phosphate, chlorides and nitrogenous products occurs with renal impairment.[23,24,27]

Phosphatase which is an important enzyme in regeneration of bone is also elevated in hyperparathyroidism because nature makes an attempt to form new bone where old bone is being removed.[29]

The order of events in the pathologic physiology of hyperparathyroidism may be briefly summarized as follows:[22] (1) excessive activity of the parathyroid, (2) extraction of minerals from soft tissues and their excretion, (3) mobilization and withdrawal of not only calcium, but earthy alkaline substances from bone, (4) proliferation of osteoclasts to phagocytize the decalcified matrix and proliferation of fibrous tissue to replace the bone.

Primary hyperplasia of the parathyroid glands is the result of adenoma with secretion of excessive amounts of parathormone and depletion of the calcium stores, resulting in generalized osteoporosis or osteitis fibrosa cystica. Secondary hyperplasia is a compensatory mechanism and can be due to such underlying conditions as:[13,20] chronic renal insufficency, severe rickets, osteomalacia, osteitis deformans, fragilitas ossium, multiple myeloma, metatstatic carcinoma of bones and nephrolithiasis.

The exact mechanism of parathyroid hyperplasia in chronic renal insufficiency or renal rickets is debatable; however, retention of phosphate is generally admitted to be the initial stimulus.[2,11,24] Drake, Albright and Castleman were able to produce parathyroid hyperplasia in rabbits by repeated injection of a neutral buffered isotonic solution of sodium phosphate.[11] In renal insufficiency the plasma phosphates tend to be high because the kidney cannot excrete them readily. The high phosphate level lowers the plasma calcium which acts as a stimulus to the parathyroids.[6]

Histology

The normal gland is generally considered to have three types of cells; the chief, water-clear and oxyphil cells. The first two are probably the same except for degree of maturation. Based on size and structure of the protoplasm, these cells are divided into four types; dark, clear, vesicular and water-clear.[6] The chief cells are small and possess dense cytoplasm in contradistinction to the water-clear cells which are large with vacuolated cytoplasm. The other cell types are considered transitional with the great majority of the cells belonging to the intermediate type, thus giving the impression of a progressive development from the dark chief cells through the intermediate types to the water-clear cells.[6] The oxyphil cells possess a dense acidophilic cytoplasm.

Welsh in 1898, in a study of normal glands from forty human autopsies, was the first to distinguish the oxyphil cell from the predominate chief cells and derivatives.[10] He believed that the least specialized cell was what is now called the "water-clear" or "wasserhelle" cell. The arrangement of both the oxyphil and chief cells varied from masses to anastomosing and branching columns and finally cords of a single cell width. True acini formation were only rarely found.

Histologic studies confirm the monophyletic theory of the origin of the various cells.[6,10] Surprisingly enough, little of fundamental importance has been added since the original description of Welsh. Kurokawa,[10] in studying 815 glands removed from 240 necropsies, ranging in age from a seven-month-old fetus up to eighty years of age, found that up to puberty the cells are all water-clear cells containing glycogen but no fat. At puberty these cells begin to decrease and the dark chief and oxyphil cells gradually appear. The dark chief cells contain fat but no glycogen and the oxyphil cell contains neither fat nor glycogen. When the cytoplasm in the chief cell is entirely absent (complete vacuolization) the cell is called "water-clear" or "wasserhelle" cell. At puberty or soon afterwards the pale oxyphil cells gradually appear, at first singly and then in pairs, increasing in number with advancing age, forming large islands after forty to fifty years of age. The dark oxyphil cells occur singly, are not present before puberty, and likewise do not contain fat or glycogen.[10]

Histologically the parathyroid neoplasias usually contain all of the types of cells common to the normal gland.[19] Castleman and Mallory[10] did not find pure tumors of either the oxyphil or water-clear type in their series of neoplasias. Numerous transition forms can always be demonstrated. They believe that the chief cell is the basic fundamental cell with the other cells regarded as degrees of differentiation or as involution forms. Hyperplasis of the parathyroid is characterized by diffuse involvement of all the glandular tissue and occurs in two forms, a more common water-clear cell type and a much rarer chief cell type.[10]

The cells may show a considerable degree of pleomorphism with mitosis, which has often led to an erroneous diagnosis of carcinoma. It is generally agreed that the great majority are clinically benign, rarely recur, invade or metastasize.[10,13,19,23] Burke[8] reported a case

of recurrent adenoma apparently due to a transplanted fragment between the muscles of the neck.

Clinical Manifestations

Hyperparathyroidism is pleomorphic in its clinical manifestations. It may be suspected most often in three principal ways: (1) through its bone lesions, (2) its kidney complications and (3) its general somatic effects.

There are two types of bone lesions, a cystic form, osteitis fibrosa cystica, and a diffuse decalcification. Although osteitis fibrosa cystica is the classical form of the disease it is not as common as the form associated with urological symptoms.[12,13,27] Over a ten-year period in sixty-seven cases of hyperparathyroidism, Albright and associates[12] found the classical picture of osteitis fibrosa cystica in only one-third of the cases. Another one-third showed mild and often insignificant degrees of skeletal involvement, and the remainder showed no osseous disease. Norris[23] in a collective review of 322 cases found osteitis fibrosa generalisata in 191 (59.3 per cent). The symptoms resulting from involvement of the osseous system varies from vague aches of pains in the extremities and back, to a truly disabling condition with pathologic fractures, cysts, tumors and deformities.[19,20,23]

The renal complications are three: a diffuse calcinosis, calculus formation, and pyelonephritis complicating the calculi. Norris[23] found associated skeletal and renal lesions in 101 out of 322 cases (31.4 per cent) and renal lithiasis and or renal calcification alone in seventeen (5.3 per cent). Approximately 10 to 15 per cent of all patients with renal calculi have the calculi as a complication of primary hyperparathyroidism. The complication of renal calcification occurs in over 65 per cent of cases of hyperparathyroidism.[27] Keating and Cook[19] found renal calculi in eighteen out of twenty-four cases with bilateral calculi in seven cases. Fourteen of these cases had previously undergone a total of twenty surgical procedures for renal calculi.

The more general somatic symptoms as a result of biochemical changes in the blood and urine are too commonly present in other diseases to be of much diagnostic aid. They include: muscular atony, weakness, fatigue, constipation, anorexia, loss of weight, nausea, and vomiting, polyuria and polydpsia. The latter two occurred in eleven (46 per cent) of twenty-four cases.[19]

Diagnosis

The biochemical and roentgenologic studies and biopsy of the bone lesions are principal aids in the establishment of the diagnosis of hyperparathyroidism.

The demonstration of the biochemical changes is concerned with (1) an increased serum calcium, (2) a reduction of inorganic serum phosphorus, and (3) hypercalcinuria. To the foregoing may be added an increased alkaline phosphatase.

An elevated serum calcium above the normal of 9 to 11 mg. per 100 c.c. may be very slight, and repeated determinations may be necessary in order to establish a definite diagnosis. In twelve out of twenty-four cases at the Mayo Clinic,[19] the average concentration was less than 12.5 mg. per 100 c.c. The values were generally higher in those cases with classical bony changes.

The total calcium is made up of two fractions, calcium proteinate in which the calcium is bound to serum protein and ionic calcium. The former varies with changes in the protein concentration and is not primarily affected by the parathyroid hormone, whereas the ionic calcium is affected by parathormone.[19,21] It is therefore plausible that with a lowered serum protein and a normal total calcium, one may actually have an elevated ionic calcium[19,21] Neither of the calcium fractions can be measured directly; however, both apparently can be estimated from the concentration of total calcium and total protein by the use of the nomogram of McLean and Hastings.[21] Certain conditions such as multiple myeloma and sarcordosis are frequently accompanied by an increased total serum protein and by hypercalcemia secondary to the elevated protein. However, in the experience at the Mayo Clinic,[19] a reduction in serum protein to sufficiently mask hypercalcemia was rarely encountered as a diagnostic problem in hyperparathyroidism. Conversely an elevated total serum protein was a relatively frequent means of avoiding an erroneous diagnosis of parathyroid disease.

The reduction of inorganic serum phosphorus from the normal of 3 to 4 mg. per 100 c.c. is usually slight. In 25 per cent of cases, one or more determinations fell within the normal range, and 17 per cent of cases the level was at the lower limit of normal.[19]

Hypercalcinuria was demonstrated in fourteen of fifteen patients with renal lithiasis in whom hyperparathyroidism was excluded.[26] In 50 per cent of these cases there was evidence of renal damage which may demonstrate that moderately diseased kidneys may excrete calcium in the urine in the absence of other explainable causes. A low level of calcium in the urine, in a concentrated specimen, in the absence of renal disease, as indicated by the Sulkowitch test, practically rules out hyperparathyroidism.[19]

An elevated alkaline phosphatase does occur with hyperparathyroidism and is more commonly seen in the group with classical bone changes. It is believed to be the result of osteoblastic activity and therefore, not pathognomonic of the disease itself.[4,19,23,29]

Roentgenologic examination of the bones in the early stages reveals the trabeculae to be thin and delicate with the cortex so thin that the bone has a ground glass appearance.[23,30] This is best seen in the flat bones such as the calvarium. In advanced cases there is wide spread demineralization with multiple cysts, pathologic fractures,[19,30] expanding tumors and a variety of skeletal deformities. The common sites of the cystic lesions are the jaw, pelvis, long bones, ribs, metatarsal and metacarpal bones.[30] Strock,[28] in reporting the dental roentgenologic findings in forty-five out of fifty-one cases, found that one-half of the cases showed cystic-like cavities in the jaw, malocculsion, osteoporosis and absence of lamina dura.

The diagnosis of giant cell tumor of bone on biopsy or x-ray without further laboratory and metabolic studies should be made with reservation. Goldman[16] reported a brother and sister erroneously diagnosed as giant cell tumors by x-ray in one and by biopsy in the other.

Both were treated successfully by surgical removal of parathyroid adenomata. At present we do not feel that giant cell tumor of bone can be histologically differentiated from osteitis fibrosa cystica.

In summary, the possibility of hyperparathyroidism should be considered in: (1) all cases of neophrolithiasis or nephrocalcinosis, (2) all cases in which there is x-ray evidence of generalized demineralization, (3) all cases of cysts or bone tumors, (4) all cases of giant cell tumors so diagnosed by biopsy, (5) all cases in which there are symptoms referable to the skeleton, especially pathologic fractures.[1,19,23]

The secondary or compensatory hyperplasia of the parathyroids due to some underlying disease must be differentiated from primary hyperplasia (adenoma) of the parathyroid gland. In the former, surgical removal will not cure the underlying pathologic process.

Treatment

The treatment of primary hyperplasia is surgical excision, and it may occasionally challenge the ingenuity of the surgeon to locate the erring gland or glands. Following surgical removal, the serum calcium falls rapidly to normal in a day or two with the inorganic phosphorous returning to normal more gradually.[19] Postoperative tetany is usually not so severe that it cannot be controlled by the usual means.[19] However, Albright[2] stated that severe tetany usually only occurred in patients in whom the level of alkaline phosphatase exceeded 20 Bodansky units before operation.

The removal of a hyperfunctioning parathyroid may invite immediate chemical changes with resultant acidosis. Couch[15] reported a case of acidosis with a carbon dioxide combining power of 19 volumes per cent which was treated with dramatic results by intravenous sodium bicarbonate.

The explanation for the production of acidosis is that the acid radicals, phosphates, sulphates and chlorides tend to be retained in the blood stream while base sodium is freely excreted by the kidneys and the base calcium is retained in the bones.

Summary

We have presented a case of hyperparathyroidism due to an adenoma. This patient presented all of the principal diagnostic features of this syndrome, including (1) multiple bone cysts, (2) spontaneous fracture of bone, (3) generalized decalcification of bone, (4) renal calculi, (5) hypercalcemia, and (6) increased alkaline phosphatase.

In spite of the study of the case by several physicians, including at least one pathologist, an orthopedist, two roentgenologists, a surgeon, and two general practitioners, the diagnosis was not established over a six-year period.

Physicians should always consider primary hyperparathyroidism in cases presenting (1) bone cysts, (2) pathologic fractures, (3) renal calculi, (4) "giant cell" tumor of bone, and (5) generalized decalcification of bone.

An incomplete review of the literature has been presented.

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It has been estimated that nearly four per cent of all persons who visit physicians' offices are coughing or expectorating. The alert physician will insist upon a sputum examination of all such patients. Such practice will be rewarded by the discovery of tubercle bacilli in three or four of every 100 specimens examined. The country doctor will often be astonished to discover that a patient with slowly resolving pneumonia has an acid-fast reason for prolonged convalescence.—*Pub. Health Rep.*, Dec. 6, 1946.

CASE FOR DIAGNOSIS

A. J. HERTZOG, M.D., and JULIAN SETHER, M.D.
Minneapolis, Minnesota

DR. JULIAN SETHER: This case (A-46-2461) was that of a sixty-six-year-old woman who was admitted to the Minneapolis General Hospital at 11:00 P.M. on November 30, 1946, with a two-hour history of severe sudden nonradiating pain in both lower abdominal quadrants. The pain was associated with nausea, vomiting, and several loose bowel movements. Melena or hematemesis was not noted. The pain was colicky, sharp, and stabbing.

The patient was first seen in this hospital in July, 1938, complaining of polydipsia, polyuria, and dysuria of one year's duration. Blood pressure at this time was 145/82. The diagnosis of diabetes mellitus was established. She was discharged on insulin therapy. She was again admitted in March, 1940, because of some swelling of her ankles. Blood pressure was 150/90. An electrocardiogram showed left axis deviation. The left optic lens was removed in 1941 because of a cataract. In 1942, a cystocele and rectocele were repaired. In March of 1943, auricular fibrillation was present and she was digitalized. In 1945, a midthigh amputation was performed for gangerene of the left foot. The blood pressure was 230/88. The heart showed numerous extrasystoles and a late diastolic murmur at the apex. She continued to take insulin and her diabetes appeared well controlled.

Physical examination on this last and final admission showed her temperature to be 98 degrees; pulse, 58 per minute; respiration, 24 per minute; and blood pressure, 210/90. She was slightly obese and was complaining of severe lower abdominal cramps. The lungs were clear. The heart was enlarged to the left. An early and late middiastolic low-pitched blowing murmur was present at the apex of the heart. The second pulmonic sound was slightly accentuated. The abdomen showed a minimal tenderness in the right upper and left lower quadrants. Minimal tenderness was present over the left costovertebral angle. The left mid-thigh amputation was healed.

Hemoglobin was 86 per cent (Sahli). Leukocyte count was 26,900 with 96 per cent neutrophiles and 4 per cent lymphocytes. Urinalysis revealed two plus sugar and numerous pus cells. The blood sugar was 515 mg. per cent and the carbon dioxide combining power of the blood was 62 volumes per cent. An electrocardiogram showed auricular fibrillation and low voltage in all three leads.

The pain persisted. On the second hospital day, she developed a complete anuria. The blood sugar dropped to 65 mg. per cent. The blood urea nitrogen rose from 79 mg. per cent on the third hospital day to 104 mg. per cent on the day of death. The anuria persisted. She became stuporous and had a convulsive seizure on the seventh hospital day. She expired a few minutes after the convulsion.

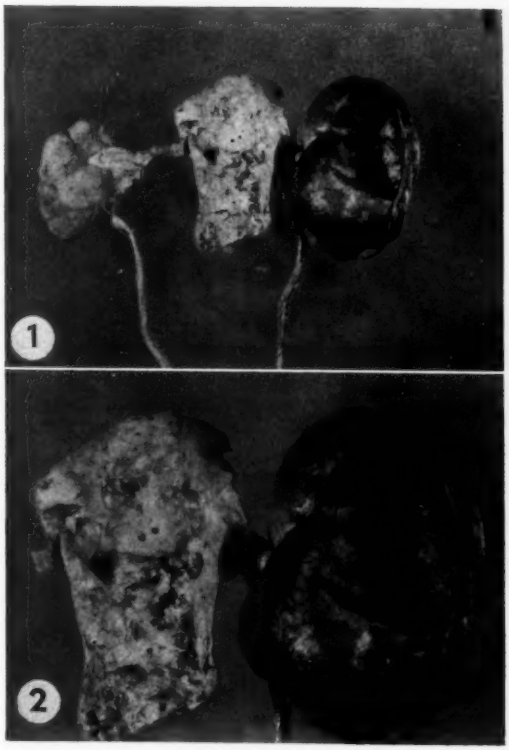

Fig. 1. *(above)* Marked atrophy of right kidney.
Fig. 2. *(below)* Infarction of left kidney with thrombosis of left renal artery.

DR. HERTZOG: This case represents a diagnostic problem. The patient was a sixty-six-year-old diabetic who expired seven days after the onset of severe lower abdominal pain. Within forty-eight hours after the onset of pain, she developed anuria. Death was apparently the result of uremia. Does anyone wish to make a diagnosis?

DR. F. GOUZE: We know the patient had severe arteriosclerosis and hypertension as well as her diabetes. The left leg was amputated in 1945 for arteriosclerotic gangrene of the left foot. One naturally thinks of some complication of arteriosclerosis such as mesenteric thrombosis. Her heart was fibrillating so there is also the basis for an embolic phenomenon. The cardiac murmur suggests a mitral stenosis. The left ventricular enlargement could be explained on the hypertension.

From the Department of Pathology, Minneapolis General Hospital, A. J. Hertzog, M.D., Pathologist.

DR. HERTZOG: The clinical picture was not that of a mesenteric thrombosis, as she was never distended nor showed signs of an ileus. A diabetic can develop chronic uremia on the basis of arteriosclerosis of the kidneys. In this case, the anuria and uremia were of sudden onset associated with severe lower abdominal pain. Does any one else wish to make a diagnosis?

STUDENTS: Dissecting aneurysm of the aorta. Thrombosis of a renal artery.

DR. HERTZOG: I think both of these are excellent suggestions in view of what we found at autopsy. How are we going to explain the anuria? Thrombosis of one renal artery would not give you an anuria. A dissecting aneurysm would likewise have to interrupt the blood supply to both kidneys. She never developed the picture of a shock. Dr. Sether will give the findings at autopsy.

Autopsy

DR. SETHER: We were naturally interested in the kidneys in this case. The right kidney was small and atrophic (Fig. 1). It weighed only 20 grams. The right renal artery showed approximately 80 per cent reduction of its lumen by atherosclerosis. The atrophy of the right kidney appeared to be due to arteriosclerosis of this renal artery. However, we cannot completely exclude a secondary atrophy associated with an old pyelonephritis. The left kidney weighed 140 grams. It had a swollen purplish red appearance. The left renal artery was completely occluded by a thrombus which began at the opening into the aorta. The appearance was that of a thrombus rather than an embolus (Fig. 2). On section of the kidney, it was completely infarcted. The heart weighed 350 grams. There was an old rheumatic mitral valve defect as found in mitral stenosis of a moderate degree. A mural thrombus was found in the left auricle. There was severe coronary sclerosis. The abdominal aorta, as seen in the illustrations, showed severe atherosclerosis. The pancreas showed hyalinization of the islands of Langerhans are found in diabetes mellitus.

The anatomical diagnosis was (1) thrombosis of left renal artery with acute infarction of left kidney; (2) renal arteriosclerosis with contraction and atrophy of right kidney; (3) uremia; (4) diabetes mellitus; (5) old rheumatic mitral valve defect; (6) mural thrombosis of left auricle; (7) generalized arteriosclerosis; and (8) ancient amputation of left leg.

DR. HERTZOG: The clinical picture is now explained when we know that from a functional standpoint the patient possessed only one kidney. When this remaining kidney became infarcted as a result of thrombosis of the left renal artery, she developed the pain and anuria.

DECAY OF THE FAMILY?

It is alleged that the institution of the family in Western civilization is going on the rocks. *Life* magazine† discusses the question editorially, pointing out that according to Dr. Carl Zimmerman, Harvard sociologist, "the Western family has collapsed twice before, in Greece about 300 B.C. and in Rome about 300 A.D., in each case marking the decline of those states." Decay of the family in Greece and Rome was marked by corruption, vanishing birth rate, demigration of parents, juvenile and adult delinquency, says *Life*.

Certainly, accumulating statistical evidence seems to lend weight to the warnings from many sources that something is happening to the modern family. Such a state of affairs should be of the gravest concern to doctors of medicine. It is probably inevitable that as civilizations evolve from their simpler, more rudimentary forms to their complex maturity the diseases of industrial middle age and early atomic-age senescence invade their cells destructively. Oswald Spengler elaborated the thesis in his *Decline of the West* some time ago.

If the family decays, what then becomes of the family doctor? The ready answer would be that he becomes the decayed-family doctor. How near to that status is he now? If the decay of the family is marked by the symptoms recited in our first paragraph, should not medical educators, medical societies, and others interested in the future of medicine, give thought to the fact that a falling birthrate will necessitate fewer obstetricians and pediatricians, but probably more gynecologists, genito-urinary practitioners, and psychiatrists? The decayed-family practitioner could conceivably be a combination in one person of formerly separate specialties best calculated to make of him a decayed-family friend and counselor. His premedical curriculum could include law, sociology, the rudiments of police work, philosophy with special emphasis on Spencer and Spengler, abnormal psychology, the rudiments of statism, with possibly some attention to English composition.

The medical curriculum could well omit any attention to all but a certain few infectious diseases, substitute nuclear physics and diseases of irradiation, which may be reasonably expected to increase as more and more radio-active gases and other substances are released. There you have the ideal, shortened course to produce the decayed-family practitioner. Medicine should be ever on the alert to be functional in its service to humanity, wherever that may lead, even to the establishment of the qualifications and training of decayed-family doctors, if need be.—*New York State J. Med.*, July 15, 1947.

†March 24, 1947, p. 36.

Case Report

THE SURGICAL HISTORY OF A CENTENARIAN

DANIEL J. MOOS, M.D., and JOHN V. FARKAS, M.D.
Minneapolis, Minnesota

THE patient, J.F.D., aged ninety-eight years, was first admitted to the Minneapolis General Hospital on August 24, 1941, with the diagnosis of strangulated right inguinal hernia. He complained of severe pain in the right lower abdomen of approximately twelve hours' duration. There had been no nausea or vomiting. The patient's past history indicated that he had worn a truss for bilateral inguinal hernias for many years. Two years before admission he had suffered a mild heart attack but otherwise had been in good health.

Physical examination disclosed a well-developed, well-nourished, elderly white man suffering from severe pain in the right groin. His teeth were in an excellent state of preservation. The heart was enlarged to the left. The abdomen was not distended, but there was a very tender small mass in the right lower abdominal quadrant over the internal inguinal ring. Considerable excoriation of the skin was present in this region, due to mechanical irritation from a truss. The blood pressure was 168 mm. of mercury, systolic, and 72 mm., diastolic. The only other abnormal physical findings were a small inguinal hernia on the left side and a hydrocele on the right. On the day of admission the hernia was reduced by gentle taxis without anesthesia (DJM). The patient was observed in the hospital for a period of three days. During this time the dermatitis of the groin was treated locally and gradually improved. On August 27, 1941, the patient was sent home feeling well.

Second Admission—Age 99

The admission diagnosis one year later, on August 16, 1942, was strangulated right inguinal hernia.

The history obtained from relatives of the patient revealed that the man had complained of pain in the right side of his abdomen for four days, had had anorexia for several days, with no bowel movements during that time, and had had intermittent vomiting for thirty-six hours. Generalized abdominal tenderness, most marked in the right lower quadrant, severe abdominal distention, and a tender firm mass, 5 cm. in diameter, in the right inguinal region, were noted on physical examination. His temperature was 99° F. Laboratory studies, including blood and urine examinations, were within normal limits, save for signs of dehydration. A diagnosis of small bowel obstruction due to strangulated right inguinal hernia was made, and surgical treatment was advised. With an ilio-inguinal nerve block for anesthesia (1 per cent procaine solution), a right inguinal herniotomy was performed (DJM), revealing a strangulation at the internal inguinal ring. The sac contents included necrotic omentum, a large amount of dark serosanguinous fluid, and a loop of strangulated small intestine, 14 cm. long, which on further examination proved to be ileum. This was very dark in color, lacking in lustre and without visible peristalsis. There was a subserosal hematoma encircling the constricted portion of the intestine.

The internal inguinal ring was incised to allow return of circulation to the compromised portion of the bowel. The necrotic omentum was resected. The loop of ileum was wrapped in warm saline packs for ten minutes, after which it began to resume a more normal appearance, except for one portion, 3 cm. long and 2 cm. wide, which improved in color but through which peristalsis passed very poorly. The viability of this area was questionable; however, because of the extreme age and poor condition of the patient, it was decided not to resect the damaged bowel. As an alternate procedure a portion of peritoneum from the hernial sac was used as a free graft to cover the area, the peritoneum being attached to the intestine with interrupted cotton sutures. A modified Bassini-type repair was effected, using interrupted sutures of 35 gauge stainless steel wire.

Postoperatively the patient was quite ill. His course was complicated by marked ileus which was treated by duodenal suction and by restoration and maintenance of a normal fluid and electrolytic balance. On the second postoperative day, and daily thereafter, he was allowed to be out of bed in a chair. Signs of mild bronchopuneumonia developed on the third day. The temperature varied between 99° F. and 103° F. for the first ten days following surgery, then gradually returned to normal. A slight amount of purulent material drained from the operative wound, but the incision was completely healed at the time the patient was discharged from the hospital on October 6, 1942.

Third Admission—Age 100

The admission diagnosis, seven months later, on March 15, 1943, was a possible head injury with lacerations of the scalp.

According to the history obtained from relatives of the patient, he had been found lying in the street in a somewhat dazed condition, apparently having fallen on the icy pavement. Physical examination on admission revealed an elderly white man who had sustained a scalp laceration 3.5 inches long in the left parietal region. He was somewhat irrational but not unconscious. Further examination showed a well-healed right inguinal operative scar. The blood pressure was 148 mm. of mercury, systolic, and 100 mm., diastolic. The pulse rate was 100 beats per minute. Neurological examination was negative except for signs of mild confusion. The laceration of the scalp was cleansed and repaired under local anesthesia (1 per cent procaine solution) with several silk sutures. On March 18, 1943, a lumbar puncture was performed. The spinal fluid was clear, colorless, and under no increased pressure. The cell count was normal. Roentgenograms of the skull showed no evidence of fracture. The patient was allowed to be ambulatory, and his clinical course appeared to be satisfactory until March 20 when he complained of pain in the left groin. Examination at that time disclosed a tender mass, 7 cm. in diameter, in the left inguinal region which clinically appeared to be a direct inguinal hernia. This was irreducible using gentle taxis; therefore, an emergency herniotomy was performed (JVF).

One per cent procaine solution was used for local anesthesia. A strangulated sliding type of hernia, forming a mass 6 by 8 cm., was found. The hernial sac contained several cubic centimeters of clear yellow

From the surgical service of the Minneapolis General Hospital.

fluid. The sliding portion of the hernia was formed by a part of the sigmoid colon. After incision of the constricting band at the neck of the sac, no impairment of circulation of either the large bowel or the mesocolon persisted. The neck of the sac was reconstructed, ligated, and the redundant portion amputated. Orchidectomy was performed in order to obtain a more firm repair. Interrupted cotton sutures were used throughout.

The patient was permitted to be out of bed on the first postoperative day. On the fourth day following surgery his temperature suddenly rose to 104° F. and signs of left pulmonary atelectasis appeared. This was treated by inhalation of 20 per cent concentration of carbon dioxide gas, combined with manual chest compression over the left side of the thorax. The patient expectorated a large amount of grayish mucus, following which his condition steadily improved and his temperature receded to normal. He was allowed to be up each day. The skin clips were removed on the sixth postoperative day and the wound was found to be healing by primary intention. At the time of discharge on May 3, 1943, the patient was in good health. He had no complaints, and his operative wounds were well healed.

Fourth Admission—Age 102

The patient was admitted on October 7, 1943, to the neurological service with a diagnosis of cerebral apoplexy. Physical examination revealed an elderly white man in an unconscious state. His entire left side exhibited flaccid paralysis. The blood pressure was 190/80. Laboratory studies indicated normal blood and urine findings. Examination of the abdomen showed bilateral, well-healed herniorrhaphy scars, with no recurrence of hernia. The right hydrocele was again noted.

The patient was in poor general condition during his entire hospital stay, and his prognosis was grave. Despite the administration of 620,000 units of penicillin between October 15 and October 20, for treatment of pneumonia which had developed, his course was downhill, and he expired on November 27, 1945. Permission for autopsy was not obtained. The causes of death were: (1) encephalomalacia, right internal capsule due to thrombosis; (2) generalized arteriosclerosis, and (3) senility.

Summary

1. There is presented the case of a man requiring emergency operation for strangulated inguinal hernia on two occasions, one at the age of ninety-nine years, the other at the age of 100.

2. Local anesthesia was the anesthetic of choice for both procedures.

3. Early ambulation was allowed following each herniorrhaphy.

4. Pulmonary complications followed both operations despite early ambulation.

5. Wound healing was satisfactory.

6. The patient was observed over a period of two years, during which time no recurrence of either hernia was noted.

ARMY ENGINEERS TO BUILD MEDICAL CENTER

What is planned to be the greatest medical research center in the world will be built at Forest Glen, Maryland, by the Corps of Engineers for the Office of The Surgeon General, according to a recent announcement made by Major General Raymond W. Bliss, The Surgeon General. In keeping with technological advances in all fields, based on experiences in the late war, the center will be equipped to anticipate and meet the medical problems of the future as well as to cope with those of the present. The initial cost is estimated at approximately $40,000,000. Construction will be supervised by the District Engineer, Washington, D. C. Engineer District.

Officially designated as the "Army Medical Research and Graduate Teaching Center," the project will consist of a 1,000-bed general hospital, capable of expansion to 1,500 beds; the Army Institute of Pathology building; the Army Medical Museum and Center Administration building; Central Laboratory Group buildings; and the Army Institute of Medicine and Surgery. A working library, animal farm, quarters for the staff and other buildings, are included in the plans.

Located just outside of Washington, the new Army Medical Center will have the advantage of close relationship to the Walter Reed General Hospital, the Naval Medical Center, the medical schools of the District and the proposed new Washington Medical Center, with all of whom ideas can be interchanged. In addition, members of the District of Columbia Medical Society, among them some of the finest specialists in the world, and medical experts from other Government departments, will be available for consultation. The Center will also co-operate with the National Bureau of Standards, the National Institute of Health and the National Research Council.

BIRTHS EXCEED ONE AND ONE-HALF MILLION

Births in May, 1947, are estimated to have numbered 302,000 in the United States, according to figures released by the National Office of Vital Statistics, U. S. Public Health Service. This is 29 per cent more than the estimate for May of last year and it brings the total for the first five months of this year to 1,572,000.

Although the birth rate of 26.4 per 1,000 population including the armed forces overseas for the five-month period, January to May, 1947, was nearly 40 per cent higher than the provisional rate of 19.1 for the corresponding period of 1946, the birth rate has been lower this year than it was in the last four months of 1946 when it reached record-breaking heights. The decrease has taken place in spite of the fact that publications of this Office show that the number of marriages reported ten to twelve months ago and throughout 1946 were unusually large. It is possible that the peak in the birth rate in the latter months of 1946 was due not only to first births to newly married couples, but also to births to families who already had children and first births to couples married before or during the war. The fact that the birth rate has decreased while marriages remained high suggests that now second and third births to established families and first births to persons married more than one year are adding less to the birth rate than they did at the end of last year.

The estimated numbers of births in each of the forty-six states reporting monthly and the District of Columbia appear in the *Monthly Vital Statistics Bulletin* released by the National Office on July 9, 1947.

History of Medicine In Minnesota

NOTES ON THE HISTORY OF MEDICINE IN FILLMORE COUNTY PRIOR TO 1900

By NORA H. GUTHREY
Mayo Clinic
Rochester, Minnesota

(Continued from June issue)

D. N. Morse, born in New York in 1826, arrived in Chatfield in 1856 accompanied by his wife, Phoebe Morse, who was a native of Ohio, born in 1834. Their son, Travers, who in 1860 was three years old, according to a census report, was one of the first children born in Chatfield.

Physician and dentist, Dr. Morse was one of the earliest practitioners in Chatfield and certainly was one of the first of any profession to place a card in the recently established newspapers of the village, the *Republican* and the *Democrat,* both of which printed their initial editions early in the autumn of 1856.

In the *Chatfield Republican* of November 22, 1856, Dr. D. N. Morse, dentist, announced that he was one mile east of Chatfield on the La Crosse Road. In a later issue he elaborated as follows:

> D. N. Morse, Physician and Dentist, will be found at all hours except when absent on professional business, at his office one mile from town on the La Crosse Road. Particular attention paid to all branches of the profession of medicine and dentistry.

After 1857 Dr. Morse's cards did not appear in either of the newspapers. His name has not been noted in any of the available early business and professional directories, beginning in 1865.

"Dr. Murray, President," was the name appended to an announcement of a meeting of the Fillmore County Eclectic Medical Society to be held on July 31, 1869, which appeared in the *Preston Republican* of July 23, 1869. Inasmuch as this is the only mention of a Dr. Murray in Fillmore County that has been seen by the writer and inasmuch as Dr. J. J . Morey (and the name in the transactions of the society was spelled "Morrey") was a charter member and an early officer of the group, it is assumed that Dr. Mor(r)ey may have been the signer of the notice; furthermore, the two names never appeared in the same notice. The assumption seems justified when it is remembered that in those days material submitted to the local editor probably was written in longhand, which is easily subject to misinterpretation.

Hildus Augustinus O. Nass was born on January 8, 1872, in Winnesheik County, Iowa, the son of H. O. Nass and Anna Nass, both of whom were natives of Norway; his father was a farmer and storekeeper.

Hildus Nass was a pupil in the public schools of Waukon, Iowa, received

his premedical instruction at the Preparatorial Department of Luther College, at Decorah, and his medical training at the State University of Iowa, at Iowa City, from which he was graduated on March 30, 1898. On the advice of friends who knew the needs of the locality and the opportunities it offered, in the summer following his graduation he settled in the village of Mabel, Fillmore County, taking up his residence there on July 19, 1898; a month earlier, on June 16, he had obtained his license to practice medicine in Minnesota. In the early days of his practice discouragement sometimes was near; he was young and looked especially young in comparison with the senior physicians of the vicinity, who were elderly men; and besides, as he had said, he was just starting and was not well known.

As it happened, when Hildus Nass was a senior medical student, he had the privilege of assisting in the office of Dr. Walter Bierring, who was then Professor of Pathology and Bacteriology in the medical department of the university. Diphtheria antitoxin had been discovered and was beginning to come into use, and Dr. Bierring recognized its merits and informed his classes. In the second autumn after Dr. Nass had settled in Mabel, an epidemic of virulent diphtheria broke out in the community, taking several lives. The disease struck, among others, a family of eight children who lived southeast of Hesper, Iowa, which is just across the state line and not far from Mabel; two of the children had died and the remaining six were desperately ill when Dr. Nass finally was called in. To quote him:

> I immediately sent to my old friend, Dr. Walter Bierring, for diphtheria antitoxin, for it was new and could not be picked up at any corner drug store, as now. I used the antitoxin in all six cases and the patients all made a happy recovery. As far as I know, I was the first to use diphtheria antitoxin in this community, and from then on I used it in other cases with satisfactory results, not having a death from the dreaded disease.

This experience established the young physician's name in the community and turned the tide of practice. For forty-five years, increasingly esteemed and trusted, Dr. Nass followed his profession in the locality of his original choice. In the later years of his practice his own suffering from a cardiac condition influenced him to make a specialty of the diagnosis and treatment of diseases of the heart. He long was a member of the Fillmore County Medical Society and affiliated county groups, the Southern Minnesota Medical Association, the Minnesota State Medical Association and the American Medical Association.

Early in his career Hildus Nass was married to Maymie Nassie, a native of Fillmore County, who aided him in his useful life. Dr. and Mrs. Nass were members of the Lutheran Church of Mabel.

Dr. Nass died in Mabel on March 27, 1944, at the age of seventy-two years; there were no surviving relatives.

D. F. O'Brien was a physician and surgeon, office one door north of the post office, in Canton, Fillmore County, for a few months in 1883.

On April 26 the *National Republican* of Preston, often quoted in this series of sketches, carried the following barbed announcement—the barb for a physician unnamed:

> Dr. D. F. O'Brien has opened an office in the village of Canton. He deserves a large practice. He will never neglect a patient or disgrace his profession by mal practice such as deprived Commissioner M— of the use of an arm. Dr. O'Brien's card appears in our columns. Call and make his acquaintance.

By August 30, 1883, Dr. O'Brien had departed to practice medicine in Rossville, Allamakee County, Iowa.

Christen K. Onsgard, who was born at the farm home of his parents in Spring Grove Township, Houston County, on April 10, 1863, was one of the eight children of Knute Onsgard and Bergit Larson Onsgard. His sisters and brothers were Karli, Guro, Bella, Marie, Ingeborg, Lewis and Martin. The father and mother were natives of Hallingdahl, Norway, who had come into Houston County in the early fifties.

In the biographical dictionary appended to notes on medical history in Houston County (Guthrey) a sketch of Dr. Lewis K. Onsgard contains information relative to the Onsgard family and other data common to the two physician brothers that need not be repeated in detail here.

Christen Onsgard, like his younger brother Lewis, was a pupil at the public and parochial schools of Spring Grove and helped on the home farm. The brothers, encouraged by Dr. Thore E. Jensen, of Spring Grove, who was married to their sister Ingeborg, decided to become physicians and in 1884 they enrolled at the Eclectic Medical Institute of Cincinnati, Ohio, the school where Dr. Jensen had received his training. In 1887 they were graduated in the same class and when, on June 22, 1887, they were licensed to practice in Minnesota, they received consecutively numbered certificates, Christen, No. 1460 and Lewis, No. 1461.

On receiving his degree, Dr. Christen K. Onsgard returned at once to Spring Grove to begin his medical practice. After five successful years during which he met cheerfully the hazards of country practice of the period, he moved to Halstad, Norman County, Minnesota. On his return to southern Minnesota six years later, in 1899, he settled in Rushford, Fillmore County, there to practice medicine actively for twenty-one years as an able and progressive physician and to play his part as a responsible citizen. In 1920 he moved once more to Halstad and there followed his profession until failing health forced his retirement in 1929.

Early in his career Christen K. Onsgard was married to Emma Louise Dokken, an American girl of Norwegian descent, who was born in Spring Grove. Mrs. Onsgard died in 1925 and when, in 1929, Dr. Onsgard was obliged to give up his work, he returned to Rushford to make his home with his daughter Benora (Mrs. Elvin Humble). Of Dr. and Mrs. Onsgard's five children only one, Lloyd, was living in 1942, in Halstad. Clifford died in 1906, Verna in 1912, Vernon in 1924 and Benora in 1936.

Dr. Onsgard died in Rushford on October 21, 1929, from nephritis. He was a faithful member of the Lutheran Church, was active in the local Masonic lodge (A. F. and A. M.), and was identified with medical organizations: the Houston-Fillmore County Medical Society, the Minnesota State Medical Association and the American Medical Association.

Lewis K. Onsgard (1866-1938), for forty-six years a practicing physician of the village of Houston, in Houston County, spent the first five years, from 1887 to 1892, of his professional life in Harmony, Fillmore County. As stated earlier, a detailed biographical sketch of Dr. Onsgard is included in notes on the history of medicine in Houston County.

Of **Wellington Daniel Parker, Esq.,** who came into southern Minnesota from the East, probably toward the end of the eighties, there has been little information available. There is record, however, that he belonged to the regular school of medicine, that he was licensed in the state on June 30, 1887, receiving certificate No. 1503 (R), which he filed in Fillmore County on December 13, 1887. For a time he was in Spring Valley and by 1890 he was in Lanesboro. It has been

recalled by an elderly resident of Lanesboro that in the middle nineties Dr. Parker died in that village while still a young man and that during his terminal illness his mother came from the East to see him.

James Henry Phillips, the son of parents who were natives of Tyrone County, in the North of Ireland, was born at St. John's, New Brunswick, on February 28, 1852. Five years later the family moved to Chicago, Illinois, where James Henry grew up and received his education; at one period he was employed as an engraver. Of the other members of the family little information has been available; his brother William, became a big-league baseball player with the Cleveland and Brooklyn teams between 1880 and 1890.

In 1878, immediately after his graduation from Rush Medical College, young Dr. Phillips practiced medicine in Chicago for a short time, but in June of that year he was establishing himself in Fillmore County, Minnesota, in the village of Wykoff, Fillmore Township, and in the following August he went briefly to Chicago to be married to Alice Van Osdel, of that city. Dr. and Mrs. Phillips had two children, John and Lucia, who were born in Wykoff.

Wykoff, in the seventies and early eighties, was a thriving, incorporated village, on the Southern Minnesota Railroad and connected by tri-weekly and weekly stages with the settlement of Fillmore and Watson Creek, respectively. There were mills of various sorts, hotels, wagon shops and machine shops, a German newspaper, two churches and several stores. Dr. Phillips, in addition to practicing medicine, operated a drug store, at first in association with Mr. Jorris and later with Dr. Calvin H. Robbins, with whom he had entered partnership in medical practice. Dr. Robbins, twelve years older than Dr. Phillips, had been in the county, boy and man, since 1859, in medical practice since 1866, and in Wykoff since 1875.

By late 1884 Dr. Phillips had moved from Wykoff to Preston, because of better opportunity, and in that village he spent the next eighteen years. There his chief medical contemporaries before the turn of the century were George A. Love, Henry Jones and Lyman Viall; in 1900 and 1901 came William D. M. Beadie and Wendell B. Grinnell.

Throughout his residence in the county Dr. Phillips shared in medical affairs. Beginning in January, 1880, he was county coroner for seven successive years, and from 1892 to 1895 he again held the office. After the "Diploma Law" of 1883 was passed, he received license No. 551 (R), given on December 31, 1883. In 1886 he was a member, with Dr. Love and Dr. Robbins, of the newly created medical examining board of the Bureau of Pensions of Fillmore County. At the annual meeting of the Minnesota State Medical Association, at St. Paul on June 19, 1890, he was elected to membership and there is record of his attendance at meetings thereafter and of his serving on the Committee on Necrology in 1893. In 1904 his name appeared on the roster of the new Houston-Fillmore County Medical Society.

As a public servant in civic capacity he played a useful role as well, serving several terms as mayor of Preston and many years as a member of the board of education. In 1887 he was a member of the village council. In 1889 he was a representative from his district to the state legislature. He was a member of the Presbyterian Church and of various fraternal organizations, among them the Masons (A. F. and A. M.) and the Benevolent and Protective Order of Elks.

In the early eighties Alice Van Osdel Phillips died, and in 1888 Dr. Phillips was married to Carrie Conkey, of Preston. Of this marriage there were three children: Delia, who died in infancy, William Conkey and Elizabeth.

A capable and honest physician—his son William has described him as being too honest and too articulate to be very popular—James H. Phillips was also a man of cultural background and formed literary taste, as reflected by his excellent and extensive library. The son, before he had finished high school, had read most of his college English courses from the books on his father's shelves.

From Preston Dr. Phillips moved in 1912 to Westlock, Alberta, Canada, where he carried on an arduous practice; members of his family have said that his death, on August 21, 1921, was the result of overwork. In 1943 there were living of the family: Mrs. Phillips, making her home with the daughter, Elizabeth Phillips (Mrs. L. M.) Pernell, in Dubuque, Iowa, and the son, William Conkey Phillips, of International Falls, Minnesota. John and Lucia, children of the first marriage, had died many years previously, as had the members of the original family group in Chicago.

Horace W. Pickett, a son of David Pickett, was born on July 5, 1822, in Washington County, New York, as were his older brothers, William, Edwin and Joseph. When the sons were young men they moved from New York with their father to become pioneer settlers near South Bend, Indiana.

Horace Pickett obtained his medical education at Utica, Oneida County, New York, where his uncle, Daniel Pickett, was a professor. In 1855 or perhaps a year later, then a practicing physician, he came from New York into Minnesota with his wife, Christiana L. Pickett, to the village of Carimona, Carimona Township, Fillmore County, following by several years his father and his brothers, William, Edwin, Joseph and, probably, Philo and Alonzo and his sisters, Nancy and Lorissa. The Picketts were the first settlers of Carimona; indeed, it was Dr. William C. Pickett who platted the settlement and founded it on his own land. Of the little colony Edwin Pickett returned to Indiana before 1862 but later came back to Minnesota to live, a fact which the following paragraph in the *Preston Republican* of June 28, 1862, gave presage: "An early settler, Edwin Pickett, Esq., one of the first settlers of this county, called on us the other day. He was looking well. At the present time he resides at South Bend, Indiana. He informs us that he prefers Minnesota to that state as a place of residence. He was a good citizen when here and his loss was felt when he left."

In Carimona and the surrounding community, Dr. Horace W. Pickett for many years practiced medicine and took part in civic and educational affairs of the community. An able and progressive physician, he was one of the charter members of the Fillmore County Medical Society, in 1866, and he otherwise contributed to the improvement of medical practice in spite of the fact that he was, as one of his nephews has said, so decided in his opinions that he antagonized people and lost their patronage. On an occasion when he had been called on a confinement case and arrived to find a midwife trying to make an instrumental delivery by means of a long pair of scissors, it would seem that a decided opinion was justified.

In the late winter of 1883 and 1884 Dr. and Mrs. Pickett disposed of their home in Carimona and removed to Welsh, Louisiana, in order to be near their only child, Lillie, who recently had been married to W. B. St. John of that place. Seventeen years later Mrs. Pickett died in Louisiana. Wishing to be once more with those of his father's name, Dr. Pickett, in the spring of 1901, old and frail though he was, traveled alone to Minnesota. He became ill en route, and on the day after his arrival in his pioneer home his death occurred. He was buried in Carimona Cemetery where are the graves of his old friends and of his own people: his father and mother, a sister and four brothers.

William Cowan Pickett, born on November 28, 1818, in Washington County, New York, was the son of Mr. and Mrs. David Pickett and the brother of Edwin, Joseph, Horace, Philo and Alonzo, and Nancy and Lorissa Pickett. Where he obtained his medical training has not been learned, but inasmuch as his brother Horace W. Pickett, studied at Utica, New York, where Daniel Pickett, an uncle of the brothers, was on a teaching staff, perhaps William C. Pickett also was a medical student there.

When he was a young man and already a qualified physician, William Pickett emigrated with the family from New York to Indiana and settled with them near South Bend. On the outbreak of the War with Mexico (1846-1848) he enlisted for military service and was appointed a surgeon in the United States Army.

After the war, bound on a new venture in pioneering, in the autumn of 1852 he traveled from South Bend by ox wagon with two of his brothers, Edwin and Joseph, and another young man into southeastern Minnesota Territory. They came with the view of making permanent homes, and in what was soon to be Fillmore County (March 5, 1853) they found conditions to their liking. When in a few weeks they returned to Indiana, it was to spend the winter disposing of their local property and completing preparations for their trek to Minnesota in the following spring. "On June 1, 1853, conditions being right for the maintenance of their stock on the long trip across the prairies," one of Dr. Pickett's nieces has written, " a company of four of the Pickett families (the households of David, Edwin, Joseph and William) who wished to remain together came back to the place where the three brothers had set their stakes the fall before." They were three weeks on the way.

William Pickett was accompanied by his young wife, Phoebe Means Pickett. On July 4, 1853, in the new settlement in Fillmore County, Dorso Leon Pickett was born, their first son and the first white child born in the community. In the next few years Dr. and Mrs. Pickett became the parents of two more children, Ida, born in 1854, and Ives, in 1859.

As soon as the land was opened for pre-emption, Dr. Pickett took a claim with his brother Edwin and laid out the village of Wahpeton. He evidenced his confidence in the site and the prospects by building as soon as he could a roomy, comfortable stone house as a home for his family. Owing to a clerical error the name of the post office was recorded as "Warpeton;" the settlers rejected this misnomer and chose still another Indian name, that of Chief Carimona (translated, The Walking Turtle), which duly was recorded. Before the change was made, however, W. C. Pickett served as sheriff of "Warpeton Precinct," in 1854. For a time at Carimona Dr. Pickett did a flourishing real estate business, in the conduct of which, being an ethical man and, like his brother Horace, of decided opinions, he refused to sell a lot to any one who proposed to dispense alcoholic liquor. In addition to founding a village, he was at the same time efficiently running a sawmill, operating a blacksmith shop with Joseph Pickett and a flourmill with H. Johnson, and was practicing medicine reliably.

Dr. Pickett's medical practice extended over a wide territory. Settlers were few and scattered; there were only thirteen families in the county on January 1, 1854, and on that date, it has been noted incidentally, William C. Pickett and Daniel (David?) Pickett were possessors of land in township 102, range 11; also that in the spring of 1854 "preaching" was held in the home of David Pickett. Perhaps the first practicing physician to settle within the borders of the present Fillmore County, Dr. Pickett certainly was one of the first six physicians, with Dr. Nelson W. Allen and Dr. Augustus H. Trow, of Chatfield, Dr. J. Early, of

Spring Valley, and Dr. Erastus Belden and his son Dr. Wallace P. Belden, of Hamilton and Spring Valley, all of whom are said to have come in 1853.

A good citizen, versatile and public-spirited, Dr. Pickett was active in civic affairs and local politics. Although in 1857 he was defeated for the office of county coroner, he was, in 1858, overseer of the poor and, from January 4, 1858, to January 4, 1860, he served as judge of probate court of Fillmore County and for the same two years as county sheriff. With regard to one of his less happy experiences as candidate for sheriff, the friendly *Chatfield Democrat* on October 9, 1858, stated with some bitterness:

> The Black Republican Party claim to be "the friends of free discussion," but have a poor way of showing it. Dr. W. C. Pickett, our indefatigable and worthy candidate for sheriff, in a discussion at Spring Valley a few days ago, was hissed and insulted in a manner worthy only of a crowd of "Negro worshippers," by Black Republicans present. This is free discussion with a vengeance.

In the late sixties Dr. Pickett left Carimona and the state. Carimona, his pride, was not to become the city of his dreams. Once the most promising village in the county, the county seat from March 20, 1855, to April 26, 1856, a key point on the thronging stage route from Galena and Dubuque to St. Paul and famed for its hostelry, the Carimona House, in the late sixties the village was left a few miles to the south by the Southern Minnesota Railroad. It was then that Dr. Pickett moved to Illinois, where he spent the remainder of his life.

M. G. Pingree first announced himself in Spring Valley, Fillmore County, as far as the writer has been able to learn, in the issue of August 11, 1870, of the local newspaper, *Western Progress*, and he was then in partnership with Dr. J. J. Morey, office in the Rogers Drug Store, the notice being dated as of June 22, 1870. By August 24 of that summer these physicians and surgeons were publishing separate announcements. Dr. Pingree, still in the Rogers Drug Store, stated that specialty was made of treatment of diseases of the eye and ear.

On August 25, 1870, there was announced the marriage of Dr. Pingree to Miss Frances E. Terrill, of Bath, New York, the ceremony having been performed by the Reverend N. C. Chapin; the editor, in the manner of country editors of the day, expressed affable if robust congratulations.

In January, 1871, Dr. Pingree expanded his professional announcement by informing the public that he was prepared to treat all chronic diseases of the eye and ear according to the most approved system, three years' practice in the Philadelphia hospitals (he stated) being sufficient guarantee of experience.

Whether or not the position of the space allotted was of significance, these cards or notices of Dr. Pingree appeared for many months in a different part of *Western Progress* from the cards of the other physicians of the village. Finally his name appeared in the same column as the names of his colleagues, but at the bottom, and by gradual degrees ascended to the top. By September, 1872, Dr. Pingree was calling himself an eclectic physician; by March, 1873, his name ceased to appear.

(To be continued in the August issue)

President's Letter

TUBERCULOSIS IN MINNESOTA

Throughout territorial days and for approximately the first quarter of a century of statehood, the climate of Minnesota was widely advertised as possessing curative value for those who suffered from consumption. Therefore, large numbers of families with one or more members suffering from tuberculosis migrated to this area. Thus in some years 15 per cent or more of deaths from all causes were reported to have been due to tuberculosis. It was this disease more than any other which caused the Minnesota State Medical Association to arrange for a State Board of Health in 1872. This was the third such board in the nation. Early in the present century, moreover, efforts of members of the State Medical Association brought about construction of sanatoriums in various parts of Minnesota. Minnesota physicians also supported the veterinarians in control of bovine tuberculosis. In 1895 those who sold milk in Minneapolis were required to have a license, which was not issued unless all their cows had been tested with tuberculin. This was the first city in the nation to make such a requirement. In 1923 the eradication of bovine tuberculosis was placed on a statewide basis and Minnesota achieved a modified accredited rating in 1935.

These measures resulted in a decrease of mortality, of morbidity, and of infection attack rate from year to year. Through the educational campaign of the Minnesota Public Health Association and its component societies, people became so well informed concerning this disease that a state-wide attack by the Minnesota State Medical Association became feasible. Therefore, in 1940, a program was organized by the committee on tuberculosis of the Minnesota State Medical Association. Every county and district medical society appointed a committee on tuberculosis. The physicians of Meeker County were the first as a society, in the nation, to develop an effective tuberculosis control demonstration. The results of the work of this society and its allies are reported in the June issue of MINNESOTA MEDICINE. Physicians of McLeod County were second to undertake such a program. Other counties, such as Dakota and Steele, have conducted extensive chest surveys.

The idea evolved of accrediting whole counties, somewhat after the method of veterinarians, but on the basis of tuberculosis control among human beings. In 1941, Lincoln County was the first to be accredited, and now twelve counties are accredited. Next came the idea of certifying schools with reference to tuberculosis control programs in progress. Approximately 500 schools have already been certified.

The members of the State Committee on Tuberculosis have manifested concern over the counties within which are the three largest cities of the state; namely, St. Louis, Ramsey and Hennepin counties, where there is the greatest concentration of tuberculosis in the state. The physicians of St. Louis County, a few years ago, offered photofluorographic inspection of the chest to its entire citizenry of slightly more than 200,000. Already more than half of the citizens have responded. In Hennepin County the Medical Society has received enough support and aid from the Division of Tuberculosis Control of the United States Public Health Service to conduct a city-wide chest survey in Minneapolis. This began early in May, 1947, and 400,000 citizens more than fifteen years of age are being offered photofluorographic inspection of their chests. This is the largest survey of its kind that has ever been undertaken in the United States. In the June issue of MINNESOTA MEDICINE appears a comprehensive article on such survey work by H. E. Hilleboe, formerly Director of the Tuberculosis Control Division of the United States Public Health Service, and now Assistant Surgeon General. A city-wide chest survey is being contemplated in Saint Paul by the Ramsey County Medical Society.

In the August, 1946, issue of MINNESOTA MEDICINE, the State Committee on Tuberculosis published what it considers an ideal program for any county or district medical society. For many years the ideal program has been in effect in most of the ten counties served by the Southwestern Minnesota Sanatorium and the four counties in the Riverside Sanatorium district. Recently, in the Riverside Sanatorium district, tuberculosis was found to have been completely eradicated in 219 schools.

The State Board of Health is co-operating splendidly in the program of the State Medical Association. Any county or district medical society is free to request assistance from the State Department of Health.

In 1918 there were more than 2,500 deaths from tuberculosis in Minnesota, but only 628 in 1945. Already the Committee on Tuberculosis is about to abandon the word *control* and substitute *eradication*.

Louis A. Brie

President, Minnesota State Medical Association

Editorial

CARL B. DRAKE, M.D., *Editor;* GEORGE EARL, M.D., HENRY L. ULRICH, M.D., *Associate Editors*

STATE MEETING A SUCCESS

THE ANNUAL MEETING held in Duluth, June 30 and July 1 and 2 was a great success from the standpoint of scientific interest and attendance.

The Southern Minnesota Medical Association prize for the best scientific exhibit by individuals went to Dr. Arthur H. Wells and Dr. Harold H. Joffe for their pathological anatomy exhibit, with honorable mention going to Dr. William V. Knoll for his kodachrome trasparencies of pathological specimens. The exhibits by the Mayo Foundation and Mayo Clinic were outstanding.

The total registration was 2,494, of which 1,099 were physicians and 333 were Woman's Auxiliary members.

The following officers for 1948 were elected:

President: Archibald E. Cardle, Minneapolis
First Vice President: J. R. Manley, Duluth
Second Vice President: G. I. Badeaux, Brainerd
Secretary: B. B. Souster, Saint Paul (re-elected)
Treasurer: W. H. Condit, Minneapolis (re-elected)
Speaker of the House of Delegates: C. G. Sheppard, Hutchinson
Vice Speaker: Haddon Carryer, Rochester
Chairman of Council: Frank J. Elias, Duluth
Councilor of Third District: L. G. Smith, Montevideo
Councilor of Sixth District (to fill the unexpired term of A. E. Cardle): O. J. Campbell, Minneapolis

The 1948 State Medical Association meeting will be held in Minneapolis.

LABORATORY ABUSE

THE TEACHING of medicine as conducted today in the average medical school has brought forth a crop of young physicians who seem to depend too much on laboratory procedures. Much of the bedside teaching in these schools has drifted into the dialectics of mechanised and biochemical data. The rapid strides in biochemical studies, the extension of mechanical procedures in contrast to the good history and physical examination, has crowded out clinical perception and dulled clinical judgment.

We must reverse this tendency and insist on a good analysis of a history and a physical examination before any laboratory investigations are done.

Thirty years ago, a wise clinician, noting the advent of the x-ray, electrocardiography and biochemical studies as applied to clinical medicine, made the pronouncement that all the aid of mechanical means and biochemical procedures has not shortened by one minute the making of a good clinician. No one decries the value of these laboratory methods or their growth. One does decry their unstinted use, particularly in the private hospital and office. The tendency of today, by the excessive expense of these laboratory techniques, is to "kill the goose that laid the golden egg." In fact, therein alone lies the only reasonable justification for those who advocate some form of the much tossed about shibboleth, "socialized medicine." To that thought we might add, laboratory technology is going to increase and its clinical application is going to multiply, which means that the necessity and justification of endowed laboratories to cushion the expense is obvious. A practical example of this type of cushion is the State Board of Health Laboratories.

THE NATIONAL FOUNDATION FOR INFANTILE PARALYSIS

AGAIN during these summer months outbreaks of poliomyelitis are making their appearance in many sections of the country. Last year 25,191 cases occurred in the nation, 2,882 of them in Minnesota. No one can forecast how many cases will occur this year or how badly the communities in this area will be affected. Medical science, unfortunately, cannot as yet prevent an epidemic or even one case.

Physicians in this area, as well as elsewhere, are aware of the multitude of problems poliomyelitis presents. Treatment of the disease is likely to be prolonged and extremely costly, requiring the services of many specialists. Too often the patient's family looks to the physician

for advice and guidance far beyond the immediate problem of medical care.

In times such as these, it is helpful to physicians to know that there are others prepared to share these troublesome burdens. In addition to making possible epidemic aid, education, and scientific research, the National Foundation for Infantile Paralysis is pledged to assist financially those patients who require such help. Through their generous contributions to the March of Dimes, the American people have made this possible. Hospital bills, salaries for physical therapists and nurses, purchase of special equipment, and the many other charges which may comprise the essentials of good medical care may be paid for by the chapters of the National Foundation when necessary. Local chapters of the National Foundation are scattered throughout the United States. There is one in or near your own community. Your local health officer can furnish you with the address of the chapter nearest you.

Physicians serve on the local chapter's Medical Advisory Committee, guiding the chapter in developing medical care programs and solving allied problems. Physicians are urged to co-operate with the nearest National Foundation Chapter. Notify the chapter when a poliomyelitis patient comes under your supervision. Make certain that the family of your patient knows of the chapter's existence and willingness to assist. By so doing you will be performing an essential service to your patient and relieving yourself of many unnecessary burdens.

E. J. Simons, M.D.

FOLIC ACID IN PERNICIOUS ANEMIA

With the discovery and synthesis of folic acid and its availability for the therapeutic use, the question arises whether the use of liver in the treatment of pernicious anemia should be abandoned and folic acid substituted. The answer is no; and the reason is that a certain number of patients suffering from pernicious anemia will develop neurologic symptoms when treated with folic acid alone.

Folic acid or pteroyl glutamic acid has been obtained from yeast and liver and can now be synthesized. It has been shown to be identical with liver L casei or norite eluate factor, vitamin M, and Vitamin B_c. These various preparations were shown to be of value in the prevention and treatment of anemia in chicks and monkeys.

There is no doubt that folic acid is effective in producing remissions in pernicious anemia similar to those obtained by liver. That the folic acid content of liver preparations is not the sole antianemic factor in liver extract is shown by the fact that folic acid in the dosage contained in effective liver extract is not sufficient to cause remissions in pernicious anemia. If folic acid is used in the treatment of pernicious anemia, the use of liver extract is also advised, or the patient should be watched closely for the development of neurologic symptoms. That being the case, no economy is obtained for the patient through elimination of professional visits. The main reason, however, for not substituting folic acid for liver extract is, as was stated, that a certain number of patients with pernicious anemia will develop subacute combined sclerosis if treated with folic acid alone. In the presence of neurologic involvement, folic acid is not effective, whereas liver extract in large dosage has definite value.

LEMON JUICE AND TEETH

The announcement by Stafne and Lovestedt* that the excessive use of lemon juice may be harmful to the teeth was undoubtedly a new idea to most dentists as well as physicians. According to their observations, lemon juice can cause a distinct loss of enamel structure of the teeth as shown by a hypersensitivity of the teeth to thermal changes—absence of stain lines, defects in the enamel which have usually rounded margins in contrast to the sharp margins produced by wear, and the projection of fillings above the tooth surface. Ordinarily, the tooth and filling wear down equally so that a projection of a filling suggests tooth destruction beyond nerve wear.

Lemon juice is rich in Vitamin C as everyone knows, and its value in preventing scurvy among mariners was early discovered and utilized. It has been used to some extent in reducing diets, for rheumatism, constipation, and colds where its value is open to considerable question. Children frequently suck lemons, and the authors have observed individuals who have suffered defects in the labial surfaces of the upper teeth as a result of this habit.

The observation that excessive use of lemon juice can be detrimental to the teeth—perhaps

*Stafne, Edward C., and Lovestedt, Stanley A.: Dissolution of substance of teeth by lemon juice. Proc. Staff Meetings Mayo Clinic, 22:81, (March 5) 1947.

more often in individuals who have less buffer action in the saliva—is one that should be borne in mind and doubtless can be confirmed. Because lemon juice in excess may be injurious to the teeth is, of course, no reason for eliminating it from the diet and thus sacrificing its valuable content of Vitamin C.

THE MAYO MEMORIAL

THE increased cost of construction has made necessary a substantial increase in the goal set for the construction of the proposed Mayo Memorial on the University of Minnesota medical campus, bringing the total to $3,000,000. The State Legislature appropriated $750,000 in 1945 for the Memorial, an an additional $1,160,000 had been subscribed by corporations and individuals. In view of increased cost of construction, the last Legislature made a second appropriation of $750,000 contingent upon the raising of a like amount by private subscription. This meant that the Mayo Memorial Committee had to raise an additional $340,000, if the original undertaking was to be carried through. Some $90,000 of this $340,000 had been raised by the middle of July.

For clarity's sake, it might be mentioned that the original Memorial has been enlarged to include the School of Public Health, the Medical Library, and the Cancer Research Institute, funds for all of which are being provided from other sources. This unification in one building will effect eventual economy in operation.

It would be unfortunate if the original scope of the Memorial would have to be curtailed because of lack of funds. The committee in charge is making every effort to raise the last $250,000 needed and is asking non-contributors for assistance in addition to requesting increases from those who have already contributed, wherever possible.

Checks should be made payable to the Mayo Memorial Fund and should be sent to 63 South Robert Street, Saint Paul 1, Minnesota.

BOND-A-MONTH PLAN

THE Treasury Department has devised an easy savings plan which in its simplicity should appeal to the physician. All he does is to sign a card at his bank authorizing the bank to purchase each month a Savings Bond for $37.50, $75, $150 or $300 and deduct the corresponding amount from his bank balance. He receives the bond each month and all he has to do after signing the card is to place the bond in his safety deposit box. It is rather surprising how much can be saved in ten years by this method. A $37.50 bond purchased each month will amount to $4,998 in ten years; a $300 bond a month, $39,984 in the same period.

The U. S. Department of Commerce has conducted studies of physicians' incomes and has shown that, on the average, the age period from thirty-five to fifty-four is the money-making period in the physician's career. The peak is reached in the early fifties and begins to decline at the age of fifty-four. Few physicians have the time to study investments, and even professional advice on the subject is notoriously unreliable. This bond-a-month plan furnishes a 30 per cent increase in the savings over the ten-year period in as guilt-edge securities as are obtainable. Physicians are not covered by social security nor other retirement plans and so are forced to provide for their own needs in their declining years. The bond-a-month plan recommends itself.

POLIOMYELITIS VIRUS IN SECRETIONS OF NOSE AND THROAT

Poliomyelitis virus has been demonstrated in material expelled from the mouth (or nose) of two patients out of nineteen studied. This was achieved by having patients blow or spit into cloth masks from which virus was extracted. Virus was also detected in nasal swabs of the first patient and pharyngeal swabs of the second patient shown to have eliminated virus from the nose or mouth. Certain implications of these findings have been discussed. It is to be emphasized that their epidemiological significance or insignificance is yet to be determined.

Ward, Robert, and Walkers, Burrill: The elimination of poliomyelitis virus from the human mouth and nose. Bull. Johns Hopkins Hosp., 80:98-106, (Jan.) 1947.

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(Continued from Page 744)

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DOCTOR CHESLEY HONORED

The following citation was awarded Dr. A. J. Chesley, secretary and executive officer of the Minnesota State Board of Health since 1921, on the occasion of the presentation to him of an Honorary Life Membership by the American Social Hygiene Association. The citation gives a résumé of his busy career.

Dr. Chesley has been largely instrumental in making the Minnesota State Board of Health one of the most efficient organizations of its type in the country. His co-operation at all times with the medical profession of the state has been outstanding.

Albert J. Chesley, M.D.

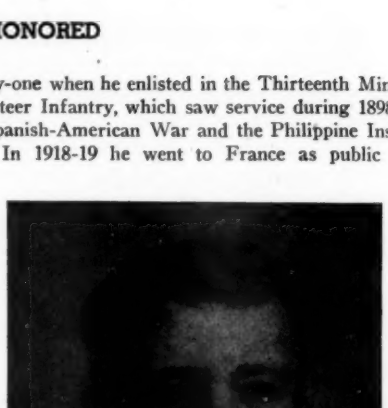
One way of measuring a man's worth is to consider what the history of his times and the setting of his life might have become without his influence. This method, like any other ordinary yardstick which one might try to apply to the subject of these remarks, will not do in his case. It is clearly impossible for those who have known and worked with Dr. Chesley through the years to visualize the scene without him. It would be even more preposterous to attempt any speculation as to what might have happened differently had he not been there. There is no room for hypothesis. He was always there. Usually ahead of the rest of us.

For example, take his connections with the State of Minnesota. He was born in Minnesota (September 12, 1877, say the excellent vital statistic records of that state); he was educated in Minnesota (Doctor of Medicine, University of Minnesota, 1907); he got his first job in Minnesota with the State Board of Health (assistant bacteriologist was the first full-time assignment, but he had worked in the state laboratory all the way through medical school, from 1902); he has worked for the same boss ever since, having been secretary and executive officer of the State Board since 1921. For twenty years, from 1925 to 1945, he was professor of public health in the State University's Department of Preventive Medicine. He married a Minnesota girl (another M.D., Placida Gardner, in 1920), and their daughter Louise is Minnesota-born and trained.

Nobody could very well think of health in Minnesota's last forty years without Chesley there.

Or consider his part in the affairs of the Conference of State and Provincial Health Authorities of North America. For more than a third of the history of this sixty-three-year-old organization, founded in 1884 to serve as a clearing-house and policy-planning agent for official public health activities in the United States and Canada, Dr. Chesley has been the king-pin. He became Conference president in 1924, served until 1927, and for the next twenty years was secretary-treasurer, 1946 being the first year he has succeeded in getting his annual resignation accepted. It would be hard to picture Conference matters during this quarter-century, which compassed the problems of World War I's postwar period, a major economic depression, and a second World War—without Chesley's hand among those on the helm.

Chesley knew war from first-hand experience. He was twenty-one when he enlisted in the Thirteenth Minnesota Volunteer Infantry, which saw service during 1898-99 in the Spanish-American War and the Philippine Insurrection. In 1918-19 he went to France as public health



ALBERT J. CHESLEY, M.D.

expert for the American Red Cross, and in 1919-20 he served in Poland as chief of staff for the ARC Commission. In 1940, when Minnesota's vast park areas were selected as the scene of the first National Guard maneuvers in the defense program, Chesley was there again, planning months ahead of the mobilization date for the welfare and health protection of the Guardsmen during their stay in the State of Lakes. Calling on the American Social Hygiene Association for advice, he set up a plan which involved patrols by the State Police, careful inspection by state authorities of applications for cottage and trailer-camp permits in the camp regions, and other safeguards against the invasion of camp-followers and the venereal disease infections they are prone to spread. The results of this preparation were summarized in a letter from the Corps Surgeon in Charge of Medical Services during the maneuvers, which said, in part: "There was no undue prevalence of any type of communicable disease; and further, since the completion of the maneuvers, with the return of regular Army troops to home stations and the demobilization of the National Guard troops back to civilian status, there has been no report to this office of venereal infection . . ."

The Chesley program of planning ahead, seeing the job through, and measuring results is well-shown by Minnesota's social hygiene work developed under his direction. Trained in bacteriology, and epidemiology, and having served in both those departments of the State Board of Health, he early saw the dangers and the opportunities in venereal disease control and prevention.

In 1914 he was appointed director of the Board's newly created Bureau of Preventable Diseases, and in 1917, when the State of California appropriated funds to set up a war emergency social hygiene program and borrowed Dr. Harry G. Irvine of Minnesota to direct it, Dr. Chesley gave every assistance to the development of the project. In 1917 he secured a Commission in his own state and arranged for the return of Dr. Irvine as Minnesota's State Director of Venereal Disease Control. Dr. Irvine is still there, and in a characteristic disclaimer of personal credit, Dr. Chesley says of the Minnesota program: "Irvine has been responsible for it through World Wars I and II, and in the years between, with emphasis right along on the positive aspects of social hygiene, education, through courses in high schools and colleges in anatomy, ethics and sociology. A series of teaching units for use in high schools will be published in 1947."

Minnesota was one of the states showing the smallest proportion of venereal disease infections—less than seven per thousand men—among Selective Service candidates in World War II, and as in other states having long-range social hygiene educational programs, it is believed that this preventive campaign had much to do with this fine health record.

After assigning due credit to his efficient staff in other fields as well as in social hygiene, there seems to be plenty left over for the chief, according to competent judges. The pioneer American Child Health Association held him a member of its Board of Directors. The American Public Health Association, of which he is a fellow, elected him president in 1930. He has served on the Board of Scientific Directors of the Rockefeller Foundation's International Health Division. He is an Honorary Fellow of Britain's Royal Sanitary Institute. The American Medical Association (he is a Fellow) values him as a member of its Joint Committee with the National Education Association on Health Problems in Education. He is a member of various professional organizations, including the Hennepin County Medical Society, the Minnesota State Medical Association, the Association of Military Surgeons of the United States and the American Epidemiological Society, and of groups such as the National Society for Prevention of Blindness, the Veterans of Foreign Wars, the Order of Masons, Nu Sigma Nu Fraternity, and the American Social Hygiene Association. For the latter organization he has served as a member of the Board of Directors, a vice president, and on various special and standing committees, being at present a member of the committee on nominations.

These contributions as they stand could well serve as a basis for Dr. Chesley's election by the Association's 1947 Committee on Awards as an Honorary Life Member, and the Committee takes pleasure in setting down the facts. But quite aside from noting social hygiene co-operation and achievement, we desire to record here, on behalf of the many who share his friendship, a warm affection for and a deep appreciation of a stout-hearted fellow-worker in whom idealism, humor, common-sense and wisdom are equally measured and well mixed for the benefit of all with whom he has to do.

METOPON HYDROCHLORIDE

(Methyldihydromorphinone Hydrochloride)

In 1929 with the funds provided by the Rockefeller Foundation, the National Research Council, through its Committee on Drug Addiction, undertook a co-ordinated program to study drug addiction and search for a non-addicting analgesic comparable to morphine. The principal participating organizations were the Universities of Virginia and Michigan, the United States Public Health Service, the Treasury Department's Bureau of Narcotics, and the Health Department of the State of Massachusetts, which brought together chemical, pharmacological and clinical facilities for the purposes of the study. Metopon is one of the many compounds made and studied in this co-ordinated effort.

Chemically Metopon is a morphine derivative; pharmacologically it is qualitatively like morphine even to the properties of tolerance and addiction liability. Chemically Metopon differs from morphine in three particulars: one double bond of the phenathrene nucleus has been reduced by hydrogenation; the alcoholic hydroxyl has been replaced by oxygen; and a new substituent, a methyl group has been attached to the phenanthrene nucleus. Studies made thus far indicate that pharmacologically Metopon differs from morphine quantitatively in all of its important actions: its analgesic effectiveness is at least double and its duration of action is about equal to that of morphine; it is nearly devoid of emetic action; tolerance to it appears to develop more slowly and to disappear more quickly, and physical dependence builds up more slowly than with morphine; therapeutic analgesic doses produce little or no respiratory depression and much less mental dullness than does morphine; and it is relatively highly effective by oral administration.

In addition to animal experiments, these differences have been established by extensive employment of the drug in two types of patients: individuals addicted to morphine, and others (terminal malignancies) needing prolonged pain relief but without previous narcotic experience. In morphine addicts, Metopon appears only partially to prevent the impending signs of physical and psychical dependence. In terminal malignancy, administered orally, it gives adequate pain relief, with very little mental dulling, without nausea or vomiting and with slow developments of tolerance and dependence.

The high analgesic effectiveness of oral doses (with the elimination of the disadvantage to the patient of hypodermic injection), the absence of nausea and vomiting even in patients who vomit with morphine or other derivatives, the absence of mental dullness and the slow development of tolerance and dependence place Metopon in a class by itself for the treatment of the chronic

suffering of malignancies, and it is for that purpose exclusively that it is being manufactured and marketed.

Metopon will be available *only* in capsule form *for oral administration.* The capsules will be put up in bottles of 100 and each capsule will contain 3.0 mg. of Metopon hydrochloride. They may be obtained by physicians only from Sharp & Dohme or Parke, Davis & Co., on a regular official Narcotics Order Form, which must be accompanied by a signed statement supplying information as to the number of patients to be treated and the diagnosis on each. The drug will be distributed for *no other purpose* than oral administration for chronic pain relief in cancer cases.

The dose of Metopon hydrochloride is 6.0 to 9.0 mg. (2 or 3 capsules), to be *repeated only on recurrence of pain,* avoiding regular by-the-clock administration. As with morphine, it is most desirable to keep the dose at the lowest level compatible with adequate pain relief. Therefore, administration should be started with two capsules per dose, increasing to three only if the analgesic effect is insufficient.

Tolerance to any narcotic drug develops more rapidly with excessive dosage and under regular by-the-clock administration. Also, as a rule, the pain of cancer varies widely in intensity from time to time. Pain, therefore, should be the only guide to time of administration and dosage level. Tolerance to Metopon hydrochloride develops slowly. It can be delayed or interrupted entirely by withholding the drug occasionally for twelve hours or for as much of that period as the incidence of pain will permit.

To each physician will be sent a record card for each patient to whom Metopon hydrochloride is to be administered. He will be requested to fill out these cards and return them in the addressed return envelope. He must furnish this record of his patient and his use of Metopon hydrochloride if he wishes to repeat his order for the drug. The principal object of this detailed report is to check the satisfactoriness of Metopon hydrochloride administration in general practice. The physician's cooperation in making it as complete as possible is earnestly solicited.

The limited use of Metopon hydrochloride as described above has been recommended by the Drug Addiction Committee of the National Research Council, and the Committee, with the co-operation of the American Cancer Society, will supervise the distribution of the drug. The committee is composed of Wm. Charles White, Chairman, Washington, D. C.; H. J. Anslinger, Commissioner of Narcotics, United States Treasury Department, Washington, D. C.; Lyndon F. Small, National Institute of Health, Washington, D. C.; and Nathan B. Eddy, National Institute of Health, Washington, D. C. Queries and comments on Metopon may be directed to Dr. Eddy, who will answer them for the committee.

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MULTIPLE FOCI OF POLIOMYELITIS IN FATAL CASE

A fatal case of poliomyelitis is described which occurred in a laboratory worker. It is probable, although not definite, that this man acquired his infection as a result of exposure to poliomyelitis virus in the laboratory.

Prior to his infection he was working with human infectious material and with strains of poliomyelitis virus in their early monkey passage.

Poliomyelitis virus was isolated in this case: from the throat (during life), and at autopsy from the central nervous system, the washed wall of the duodenum, mesenteric lymph nodes and from some of the right axillary lymph nodes. Attention is called to this last fact because just prior to his illness, this patient sustained an injury to his skin on the right wrist.

Previous experiences, both published and unpublished, on the isolation of poliomyelitis virus from lymph nodes is reviewed and discussed in the light of the findings of the above case.

Histologic lesions of poliomyelitis were present in one anterior olfactory nucleus. Extensive lesions were present in the midbrain, pons, medulla and spinal cord.

"The portal of entry of the virus was not determined."

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MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association
George Earl, M.D., Chairman

ADVISORY COMMITTEE FORMED TO TACKLE NURSE SHORTAGE

The great scarcity of registered nurses which presents a problem dangerous and tragic to hospitals, physicians and the public, both in urban and rural areas, is the reason behind the recent organization of a committee of eighteen members, known as the Minnesota Advisory Committee on Nursing.

Nine different organizations are represented on this committee: the Minnesota State Medical, hospital and Nurses Associations, the State Board of Examiners of Nurses, the State Board of Health, the Division of Public Institutions, the Minnesota Catholic Hospitals, the State Department of Education and the Minnesota Farm Bureau Federation.

This Committee met with the Governor in his office on May 28 and informed him about existing conditions resulting from the nurse shortage. The Governor was very much impressed with the findings of the Committee and requested that it continue its activities, suggesting that an executive committee be selected from the group. This is now being done.

Rural Hospital Representatives Meet

Hospitals, doctors, nurses and the general public have been aware of the serious shortage of nurses for a long time, but no one has made any workable suggestions as to what should be done about it. The first concrete step was taken by Dr. W. L. Burnap of Fergus Falls when he called a meeting of rural hospital representatives at that town on September 14, 1946. The response to this meeting was excellent. Twenty-five hospitals sent representatives; others wrote assuring their support.

It was decided to begin attacking the problem as it affected rural hospitals first because hospitals in rural areas depend entirely upon city schools for nurses and because 50 per cent of all patients hospitalized are in the country, that is, outside of the Twin Cities, Duluth and Rochester.

At this first meeting it was learned that state institutions, nearly all of which are outside of the large cities, suffer also from a lack of nurses. These institutions cannot turn patients away because of this lack, and yet they must provide patients with the best possible care.

At the meeting Dr. W. L. Patterson, superintendent of the Fergus Falls State Hospital said: "In one way or another the state will see that its patients are taken care of. It must be done, and if the nursing profession cannot furnish the nurses, then State Hospitals will have to start schools."

Practical Nurse Bill Passed

Although it was a compromise measure, the Bill for the Licensure of Practical Nurses, which was passed by the 1947 Legislature, is counted as an important step toward solving part of the nurse shortage problem. This law creates a board of examiners for practical nurses and as soon as the board is organized and standards and regulations have been set, it is expected that several practical nursing schools will be established.

It is felt that the present plan of licensing practical nurses will help to a certain extent, but it does not meet the great need for more graduate nurses. There is a solution to the pressing problem, in the committee's opinion—namely, the establishment of nurses' training courses in properly equipped rural hospitals with one-year affiliation in a large city hospital. This is the goal of the present advisory committee, to get as many hospitals in rural areas as are in a position to offer nurse training courses to establish them, or as the case may be, to re-open nurse schools which are now closed.

In order to extend the study of the nursing situation, a meeting was held on March 21, 1947, in Saint Paul at which representatives of all hos-

pitals, large and small, who were interested in the problem were invited. Also present at this meeting were officials from the Nursing Association, the Hospital Association, the State Board of Examiners of Nurses, the League of Nursing Education and the Farm Bureau. The meeting was called by Dr. Burnap.

Problem Serious in Both City and Country

At this meeting it was learned that the nursing problem is just as serious in the city as in the country. The nursing board reported great difficulties in establishing nursing schools, particularly in rural hospitals, which have the facilities and teachers and which meet the minimum standards.

It was agreed by the group that in spite of difficulties it is vitally necessary to establish more schools in the country, as many well-qualified girls are found there and the training given in the small hospital makes an excellent nurse. It is the opinion of those who have been studying this problem that rural hospital courses are successful, first, because they are closer to the homes of the prospective students and, second, the courses are so arranged that the girls can earn their own way, aside from a few incidentals. Here a poor girl has an equal chance with those who have the means, the committee argues.

A special committee of physicians, hospital officials and nurses, with a representative from the Farm Bureau and one from the Department of Education, under the chairmanship of Dr. Burnap, was appointed to investigate the problems incident to setting up nursing schools in rural hospitals and also the qualifications for nurses, the question of practical nurses, student nurse recruitment and other phases of the general problem. This special committee reported to a meeting of the Committee as a whole on April 11, at which representatives from the State Legislature were present.

Up to this time the committee was unofficial, and it was agreed that there should be organized an official representative body, possessing all authority possible. With this in mind an interview with the Governor was arranged and his consent to endorse such a committee was received. The result was the present Nursing Advisory Committee.

Questionnaire Sent to Hospitals

In order that the Committee might have facts to work with, a questionnaire was drafted and sent to all hospitals in the state soliciting information as to present facilities, plans for expansion and present needs. Returns were excellent, with 75 per cent of the hospitals sending in reports within ten days, all of which was indicative of the interest in and importance of the problem.

It was evident from the returns on the survey that nursing schools in the cities are far from filled, that if they were filled there is a possibility that they might supply the nursing needs. This indicates the need for recruitment of more students of nursing.

The Committee has emphasized the fact that many well qualified girls will enter a training school near home who would not go to the city for training. Therefore, they urge the opening of rural nursing schools. However, they take note of the problems involved in setting up and staffing these schools. It is hoped that these problems can be worked out and that this state may be several steps nearer an adequate solution to the problem of the shortage of nurses as a result of the work done by the Nursing Advisory Committee.

It has been shown that this committee can be of service in continuing to clarify the nursing situation and as a liaison between the nursing board and the hospitals wishing to establish schools for practical nurses or those who offer courses leading to the degree of registered nurse. The State Medical Association has contributed financially to the study of this problem and it stands ready to support any constructive efforts which will help solve it.

HEARINGS BEING HELD ON NATIONAL HEALTH BILL

Hearings in Congress on S.545, the National Health Bill of 1947, began Wednesday, May 21, before the Committee on Labor and Public Welfare of the Senate, re-opening the verbal contest between those who believe Americans should be "helped to help themselves" and those who contend that compulsion is the only means whereby the health of this country can be maintained.

Developed along lines suggested by the American Medical Association and other allied health

organizations, S.545, briefly, provides a plan and a means to permit broadest variation of health programs at local levels and meets the needs of low income groups without an expensive system of regimentation and the inevitable destruction of quality and medical service.

Senator Taft, one of the sponsors of the bill, opened the discussions briefly outlining his measure. Said Senator Taft: "Compulsory National Health insurance is nothing more than taxation to provide free medical care for all the people. . . . When you proceed to provide free care for people who are perfectly able to pay for it themselves, you socialize the field." Senator Taft pointed out that it would be better if the government just help states to provide free medical care for persons who *cannot* afford it.

Senator Taft maintained further that socialized medicine would make every physician the employe of the federal government. Freedom to choose a doctor, he said, is a major part of our system of free enterprise.

Denies Bill Provides Charity

Answering charges of Senator Murray and others that the Taft Bill is merely a "magnificent promise" and that it "pretends to assure medical care to all people," whereas it "only makes limited medical services available and these only to those willing to accept public charity," Senator Taft commented that for the state to help people pay their debts is not charity.

It was brought out at the hearings that the Taft Bill acknowledges the problem of the uneven distribution of health and medical services in many parts of our land. In contrast to the Wagner-Murray-Dingell Bill, it encourages the gradual development of local and statewide medical insurance programs. Provisions are made for the organization of newer and better forms of medical practice to meet the new conditions created by the spread of prepayment plans.

General provisions of the 1947 Health Bill include a grant of $200,000,000 a year to states on a population basis for medical care, chiefly to low-income patients (Minnesota's allotment would be $4,119,800); establishment of an independent national health agency to handle all the federal government's health activities; and grants to states for dental care, cancer control and periodical medical examinations for *all* school children.

AMA Representatives Appear in Behalf of Bill

Dr. R. L. Sensenich, Chairman of the AMA Board of Trustees, appeared early in the hearings in behalf of Taft's National Health Bill. Having observed the standards and methods of distribution of medical care in other nations, and on the basis of experience and advice of investigators trained in health activities, he declared that he feels it evident that social legislation containing compulsions cannot be enacted without infringing upon the basic quality of American freedom.

Government administration, said Dr. Sensenich, is too far removed to be applicable to local community and individual needs. Therefore, to attain a broad and effective approach to the problem, a health program must rest on voluntary effort with legislation providing assistance.

S.545 more nearly approximates the health program set forth by the AMA, Dr. Sensenich pointed out, since the provisions of this bill are well planned and provide a sensible approach to meet the needs of the whole nation.

Dr. E. J. McCormick, Chairman of the Council on Medical Service, called attention to the fact that better health for the citizens of the nation is not a single problem, nor merely a financial problem, but that it embraces several problems. The provision for assistance to states in making surveys of medical care preparatory to the formation of a plan for extending such care is therefore a very sound one, he maintained.

Hospital Representatives Testify

Referring to the Taft Bill as "plunging boldly and courageously" into the problem of co-ordinating federal health activities, the president of the Catholic Hospital Association, Reverend Alphonse M. Schwitalla, S.J., said that the reorganization planned would be conducive to greater effectiveness and economy. He gave three main reasons for his endorsement of the bill as follows: (1) The measure undertakes to provide health care to those most in need. (2) Co-operation between private and public agencies providing such health care is assured. (3) While health care is a national problem, the bill gives full consideration to local differences and individual rights.

The American Hospital Association sent both its president and executive secretary to offer their support of the measure. They added their appreciation of the features of the bill which

(Continued on Page 797)

Minnesota Academy of Medicine

Meeting of February 12, 1947

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, February 12, 1947. Dinner was served at 7 o'clock, and the meeting was called to order at 8:10 by the president, Dr. E. M. Hammes.

There were fifty-three members and six guests present.

Minutes of the January meeting were read and approved.

The scientific program followed. Dr. Charles F. Rea, Saint Paul, and Dr. Wallace P. Ritchie, Saint Paul, each read an inaugural thesis.

PRESENT-DAY CONCEPTS IN THE TREATMENT OF HYPERTHYROIDISM

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In this paper, four phases of the present-day treatment of hyperthyroidism will be discussed: (1) the use of thiouracil; (2) the use of radioactive iodine; (3) the use of spinal anesthesia for operation and for postoperative treatment; and (4) the handling of patients who have a persistently high basal metabolic rate in spite of apparent adequate medical and surgical treatment.

Thiouracil.—The introduction of the use of thiouracil is the greatest advance in the treatment of hyperthyroidism since that of iodine. It is well known that certain substances, like urea and the sulfonamides, cause a decrease in thyroid activity and enlargement of the gland. It was only natural that the effect of other substances such as thiouracil should have been tried. Its physiologic action is to inhibit the iodine uptake of the thyroid gland. As a result, the pituitary gland becomes sensitive to the lack of thyroxin in the circulating blood and hypertrophies to produce more thyrotropic hormone. Under the stimulation of this hormone, the thyroid gland hypertrophies, but since the iodine uptake is blocked, no excess thyroxin is formed. Accordingly, there is a decrease in body metabolism.

Thiouracil is said to be effective against all types of hyperthyroidism and acute thyroiditis. In my own experience with three cases of acute thyroiditis treated with thiouracil, the results were not too impressive. At least, it took the patients as long to recover from the disease as others not treated by this drug. The dose of the drug is 0.6 gm. daily, given in four doses. Giving thiouracil in divided doses seems to be more effective than in one single dose. The response to this medication is not seen for several weeks and if iodine has been given previously, the time response is longer.

In collected reviews, it is said that about 10 to 15 per cent of all patients treated with thiouracil have some reaction to the drug. The reactions are related more to drug sensitivity than to dosage. In the first large series, death due to the drug was said to have occurred in 0.5 per cent of cases. This figure is undoubtedly high, as experience with the drug has been gained. Leukopenia occurs in 3 to 4 per cent and agranulocytosis in 1.5 to 2.5 per cent. The death rate from agranulocytosis is 26 per cent. When agranulocytosis occurs, the drug should be stopped, and penicillin and transfusions given. Fever, lymphadenopathy and skin rashes have also been reported as complications. As prophylaxis against these reactions, the patient should have his leukocyte count checked weekly and should report to his doctor immediately if signs of sore throat, coryza, malaise, skin rash, et cetera, develop. Even after the drug has been discontinued, the patient may develop toxic reactions and accordingly should be watched for at least three to four weeks after stopping the medication.

The question arises as to whether thiouracil can be used as the sole treatment of hyperthyroidism. The consensus of opinion seems to be that the drug should be used chiefly in the preoperative preparation of moderately and severely thyrotoxic patients and that it is risky to use it as the sole therapy in such cases. Some doctors have used the drug in the treatment of mildly toxic hyperthyroid patients over a period of six to eight months with no untoward effects. Such therapy is not without its dangers, however, and should be reserved for very selected cases.

The patient receiving thiouracil before thyroidectomy should have the drug stopped two weeks before operation and be given Lugol's solution, 10 drops three times a day. Under such conditions, the thyroid gland will be firmer and less vascular at operation.

The use of iodine and thiouracil gives us some insight as to the action of iodine in the hyperplastic goiter. Giving thiouracil to the hyperplastic thyroid gland makes it even more hyperplastic. While thiouracil prevents the utilization of iodine by the thyroid, notwithstanding this block, the addition of iodine as in Lugol's solution causes resolution of the thyroid gland in Graves' disease. Therefore, it is concluded that iodine exerts two actions upon the thyroid gland in hyperplastic goiter, an iodinating action and an involuting action, and that these two actions can be separated one from the other by means of thiouracil.

Radioactive Iodine.—Induced radioactivity was discovered in 1934 and that year Fermi and his co-workers in Italy prepared radioactive isotropes of iodine. In 1938 Hertz and his associates in Boston prepared radioactive iodine by exposing ethyl-iodide to radium mixed with beryllium. The activated iodine was injected into rabbits. When the various organs of the recipient rabbit were removed, minced, and spread on a mesh on a plate

Inaugural thesis.

and exposed to standard detection techniques, it was found that the normal thyroid gland had picked up eighty times as much iodine, prepared by the cyclotion method, as is utilized by a hyperplastic goiter in man.

Radioactive iodine is obtained at present by the deutron bombardment of tellurium. The result consists of a mixture of radioactive isotropes of iodine. The principal isotropes are I^{130} which has a half-life of 12.6 hours and I^{131} with a half-life of eight days. One mc. of 12 hour iodine per gram of thyroid tissue delivers 12.3 r/min., so with a 40 to 50 gm. thyroid a sizable dose of irradiation may be given.

The effect of the radioactive iodine is checked by (1) the urinary secretion; (2) measurement by external gamma ray counter (Geiger counter); (3) the basal metabolic rate; (4) involution of the thyroid gland; and (5) clinical improvement of the patient.

Radioactive iodine is given by mouth, and tastes like stale, distilled water. The dosage given is 0.5 to 1.0 mc. of 12 hour iodine per gram of thyroid tissue. The total doses average 40 to 50 mc. although as high as 79 mc. in a single dose has been given.

The advantages of administration and selective absorption of internal irradiation therapy as compared to external irradiation are apparent. Internal irradiation is not without its toxic reactions, however. Acute roentgen ray sickness may occur; hypometabolism, even to the degree of myxedema have been reported. The question of anemia and malignancy in such cases had not been answered although in the cases observed to date (and some for a period of almost ten years), the last two possible complications have not been observed.

In 1923 Means and his co-workers reported that in the treatment of hyperthyroidism by roentgen therapy, about one-third of the patients were cured, another third improved, and another third not affected. Radioactive iodine in selected series to date has been effective as a cure for hyperplastic goiter in 80 per cent of cases.

It should be stated that sufficient experiments have not been done to establish the limits of safety of the use of radioactive iodine in the treatment of thyroid disorders. At least, however, an advance in the treatment of thyroid disease has been made by this agent.

Spinal Anesthesia.—The importance of proper preparation before operation of patients with hyperthyroidism is well recognized. The patient is treated by high caloric (high protein-high carbohydrate) diet, physical and mental rest, Lugol's solution, sedation, et cetera. When the basal metabolic rate and pulse have been lowered to normal levels, the patient is considered ready for operation. More important than the decrease in the basal metabolic rate is the weight gain by the patient. It is much more important to have a patient gain weight even though the basal metabolic rate remains stationary, than to have the basal metabolic rate lowered but the patient lose weight.

The whole rationale of thyroidectomy in hyperthyroidism is to change the patient from a hyper to a hypo state of metabolism, hoping to hit a normal level. A bilateral subtotal lobectomy in one stage is the ideal procedure. About four-fifths of each lobe should be removed. Sometimes the patient is so very toxic that a stage procedure must be carried out.

In very severely hyperthyroid patients, it has been found that a one-stage bilateral lobectomy of the thyroid can be performed if a spinal anesthesia is given with the idea of inhibiting the nerve impulses to the adrenals. An anesthetic level to the fourth dorsal vertebra must be obtained if the splanchnic nerves to the adrenal are to be inhibited.

The procedure is as follows: the patient is "sneaked" under sodium pentothal anesthesia to the operating room, and 100 to 150 mg. of novocaine crystals are given intraspinally between the third and fourth lumbar vertebrae. The anesthesia level is checked by noting at what level the patient winces when pricked by a pin. Local or inhalation anesthesia is used for the neck incision. Twenty-five patients with very toxic goiters have been treated in this manner to date, and the results have been very gratifying. Especially impressive has been the smooth operative and postoperative course. Bilateral subtotal lobectomies have been performed in one stage on these patients, whereas otherwise only stage procedures would have been attempted. Also, five patients in "thyroid storm" have been treated to date by spinal anesthesia. Fortunately all the patients have responded to this therapy and there have been no deaths.

The rationale of this procedure is based on the principle that the adrenals play an important part in thyroid metabolism. Adrenalin has been used to flare up latent hyperthyroidism (Goetch test). Also, increase in adrenalin or sympathetic-like symptoms has been stated to occur in hyperthyroidism. Unfortunately the test used (Whitehorn test) to determine the amount of adrenalin in the blood is not too specific. Further study is necessary to determine how rational the premise is that adrenalin is a factor in thyroid storm. Clinically, however, spinal anesthesia in the operative and postoperative treatment of severe hyperthyroidism has proven to be a helpful procedure.

Management of patients with persistently high basal metabolic rates in spite of apparently adequate medical and surgical treatment.—Some patients with thyrotoxic goiters, in spite of excellent medical and seemingly adequate surgical treatment still have a persistently high basal metabolic rate. If the patient with hyperthyroidism has had a bilateral, subtotal lobectomy and has a high basal metabolic rate after operation, it is usually thought that there has been a recurrence or persistence of goiter to cause the difficulty. However, if the patient has had two or three operations on the neck, has had repeated series of medical management and even a course of deep x-ray therapy, the problem of how to treat such a patient with a high basal metabolic rate is quite difficult.

Fortunately, the above symptom complex does not occur very often. During the past eight years, however, six such patients have been seen by the author. They have had the following items in common: Each had had at least two explorations of the neck for thyroid tissue after the first thyroidectomy; in none was the basal metabolic rate lower than plus 30 per cent. Four had received a series of radiation therapy. All had a tachy-

cardia. Two patients have had repeated electrocardiograms over a period of four years and nothing besides the tachycardia has been found. One patient was treated with thiouracil, and while the basal metabolic rate was lowered from plus 35 to plus 7 per cent, the patient felt no better, and so the drug was discontinued after a four months' trial.

The author has felt in the management of these cases that as long as the patients feel well and the pulse does not go over 100 per minute, nothing should be done. It will be interesting to note any cardiac damage that may result from a persistent tachycardia. Also, it would be interesting to note what effect radioactive iodine would have on these patients. It is possible that they may have aberrant hyperactive thyroid tissue somewhere else in the neck or thorax, but none of them wishes further operation. One of the patients has worked regularly in a department store over a period of six years. Needless to say, these patients are being carefully followed, and it is hoped that informative data will be accumulated over the years.

Summary

Some present-day concepts in the management of hyperthyroidism have been reviewed.

1. The use of thiouracil in the treatment of the thyrotoxic patient has been the greatest advance in therapy since the advent of iodine.

2. The use of radioactive iodine may prove to be the therapy of choice in certain forms of hyperthyroidism.

3. In twenty-five severely toxic patients, the use of spinal anesthesia as part of the operative treatment made possible a single stage bilateral subtotal lobectomy when otherwise only a several-stage operation would have been ventured. Spinal anesthesia had been used on five occasions in the treatment of "thyroid storm" with beneficial results.

4. Of six patients, followed over several years, with persistently high basal metabolic rates after seemingly adequate medical and surgical treatment, the author has adopted a policy of watchful waiting. As long as the patient feels well and does not have too high a tachycardia, no treatment of such patients is indicated.

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Discussion

DR. MARTIN NORDLAND, Minneapolis: I enjoyed listening to Dr. Rea in the presentation of this subject. He has made it very clear that hyperthyroidism is a disturbance strictly calling for special treatment. The term "goiter," like the word "rheumatism" covers too much territory. It would be fortunate if a more clear-cut distinction would be made in the minds of the profession between the functional disturbance of the thyroid, such as true hyperthyroidism, and the other disturbances of the gland such as the nodular and inflammatory changes. It is only in true hyperthyroidism that the new drugs will help. Thyroidectomy has been very successful in the treatment of all types of "goiters" with the exception of true hyperthyroidism. In true hyperthyroidism, statistics reveal that in about 27 per cent of those treated by operation, the results have not been satisfactory. Several years ago, Dr. William O'Brien, of the University of Minnesota, discussed the "Future of Medicine" before the Hennepin County Medical Society. In this discussion, he pointed out that anatomy, pathology, and even surgical technique, was relatively standard. He prophesied that new developments and progress would come through chemistry, biochemistry and allied fields.

We all know what penicillin and sulfa drugs have done for surgery. In time, no doubt, a drug such as thiouracil may eliminate surgery entirely in this disturbance of the thyroid. At this time, however, thiouracil is not the drug. Early reports seem to have been too optimistic in their evaluation of the thio drugs, and to have overlooked the toxicity likely to occur from large initial doses. Thiouracil may be a potent weapon for the control of thyrotoxicosis in many cases when used wisely, with full understanding of its possibilities and dangers. Long continuous observation is necessary. Serious complications have been observed long after discontinuance of the drug. I only wish to emphasize the fact that it is a dangerous drug, and that its use at the present time should be limited to the extremely toxic case in a large clinic or teaching institution where the patient can be observed very closely so that the severe complications, such as leukopenia and agranulocytosis do not develop. Even the most enthusiastic do not claim that this drug brings about a cure.

I cannot refrain at this time from discussing one of the important points in the diagnosis of hyperthyroidism. Too much emphasis has been placed upon the basal metabolic rate. The basal metabolic rate should never be taken as a criterion for surgery, or for the use of thiouracil. It is a recognized fact that the persistently rapid pulse comes first in importance. The rapid pulse with weight loss, together with the other cardinal symptoms of hyperthyroidism are much more important than the basal metabolic rate. This observation (basal metabolic rate) is only confirmatory.

I have had no experience with radioactive iodine and therefore cannot discuss this phase of treatment. This may be something well worth while in the near future.

Those of us who have seen a severe postoperative crisis in hyperthyroidism will welcome any additional method for the management of this problem. Spinal anesthesia, as Dr. Rea described it, may develop into an excellent weapon for the treatment of these patients. Fortunately, the severely toxic patients are seen less often than previously; and, in most of our toxic cases, the postoperative crisis can be avoided by proper preoperative preparation.

I want to congratulate Dr. Rea for his excellent presentation. I am very happy to have had the privilege of listening to him and to have had the opportunity of discussing his paper.

DR. J. A. LEPAK, Saint Paul: Dr. Rea ought to be congratulated for bringing to our attention such a timely subject as the recent advances in the treatment of hyperthyroidism. Anyone who wants to use thiouracil ought to be not only a good clinician but also employ a good laboratory. Some time ago I listened to a discussion of the action of thiouracil by a member of the Mayo Clinic. The more the drug was used, the more cautious was everyone in prescribing it. Where Lugol's solution sufficed to prepare the patient for operation, thiouracil was never

employed. Certainly the mortality rate from thiouracil is all out of proportion to its benefits when compared with the harmlessness of Lugol's solution.

The clinical manifestations of hyperthyroidism do not run parallel with basal metabolic readings. Sometimes the clinical manifestations of hyperthyroidism are all out of proportion to the basal metabolic readings. We have to wait, therefore, for a considerable time for the proper evaluation of the benefits of thiouracil in the treatment of hyperthyroidism.

Personally, on account of the relatively high mortality rate of thiouracil at the present time in the treatment of hyperthyroidism, I favor the administration of Lugol's solution and the operative procedure. Dr. Rea has brought out a very controversial subject and I hesitate to accept it without further studies, controls and observations.

DR. C. N. HENSEL, Saint Paul: I do not like to let such a splendid presentation pass with nothing but "cold water" thrown on it by a surgeon and by an internist.

I have had experience with the use of thiouracil in the treatment of thyrotoxicosis in but one case; but, in that case, the results were so satisfactory and lacking in hazard that I am planning to use it again.

The case is that of a nineteen-year-old unmarried woman who had been nervous since puberty and whose symptoms of hyperthyroidism dated back about two years but were not recognized as such until February, 1945, when her metabolic rate was plus 48 per cent.

In May of 1945 she was examined at the Mayo Clinic where her metabolic rate was reported as plus 51 per cent. She was kept in bed, in the hospital at the Mayo Clinic, on sedatives and Lugol's and the standard preoperative management for a period of six weeks. She was then sent home as unsuitable for surgery.

On September 10, 1945, she entered the Miller Hospital as a patient of Dr. Jones to be prepared for thyroidectomy. She was put to bed on sedatives and Lugol's, 15 drops t.i.d. (the use of iodine had been haphazard in the previous weeks), and on a full diet.

Her metabolic rate was plus 54 per cent, heart rate 120 beats per minute, and blood pressure 180/100. After a week on such a regime, there was absolutely no improvement in her condition.

At this juncture, I was called in and found a patient with a severe thyrotoxicosis, exophthalmos, cardiac palpitation, bodily restlessness, tremor, quadriceps weakness, emotional instability, and insomnia. The thyroid gland was diffusely enlarged, smooth in outline, and firm in consistency. The heart was enlarged and slamming in action and there was a systolic murmur over the apex.

The standard treatment was obviously not effective in this case, so we decided to try thiouracil which was then on the reserve list and could only be obtained from the manufacturer.

We read the available literature on this new drug, familiarized ourselves with its dangers and precautions, and on September 22, 1945, commenced treatment with thiouracil 0.2 gram t.i.d., with 10 grains of soda bicarbonate added to each dose, and ordered leukocyte counts and differential smears made every day.

Within the first week there was an initial drop in leukocytes from 10,000 to 5,000 and then the count rose to 8,000 and remained in that vicinity. The polymorphonuclear cells ranged from 58 to 68 per cent.

By October 30, 1945, thirty-eight days after starting thiouracil, the patient was showing lessening of the thyroid drive, the metabolic rate was plus 33 per cent and the pulse rate was 80 beats per minute.

On November 1, 1945, the patient had an acute psychotic episode, left the hospital (unobserved) for two hours and on her return was in a state of shock and near collapse. Psychiatric consultation was obtained and treatment instituted on the basis of a schizophrenia. The patient was placed in bed, in restraints, put on sedatives and tube feeding. But the thiouracil was continued three times a day in a dose of 0.2 gram.

On November 21, 1945, the metabolic rate was plus 12 per cent and the pulse rate was 52 beats per minute. Because of the complicating psychosis and suggestions in the literature that long administration of thiouracil might effect a permanent cure of hyperthyroidism, we continued to give thiouracil 0.2 gram three times a day.

On November 27, 1945, shock treatments were started with insulin therapy.

On December 14, 1945, the metabolic rate was plus 7 per cent, pulse rate 62 beats per minute, and leukocyte count 12,400. Thiouracil was continued at 0.2 gram twice daily.

On December 20, 1945, the dose of insulin, which had reached 160 units a day, was stopped because of the presence of severe anginal pains and general debility. Papaverine hydrochloride, grains 1½, were used four times a day for the anginal pains. Believing that thiouracil might also be having some deleterious effect on the heart, the dose was reduced to 0.2 gram once daily and continued at that level. With the cessation of the insulin therapy, the patient soon revived, and it was evident that she would always be a schizophrenic at a childish level with a fanciful outlook on life. The hyperthyroidism was controlled and we hope to keep it so, for surely this individual was a most unsatisfactory candidate for goiter surgery.

She was discharged from the hospital on January 1, 1946, with instructions to continue thiouracil 0.2 gram once daily. At that time her hemoglobin was 90 per cent, leukocytes 7,600, polymorphonuclear cells 61 per cent and red blood cells normal. Fasting blood sugar was 105 mg., cholesterol 362 mg., blood pressure 114/60, and pulse rate 80 beats per minute.

By the persistent use of thiouracil for 100 days, we had carried this patient through a violent psychotic episode and brought a "flaming" thyrotoxicosis under control without hazard, when nothing else could have accomplished these results.

On February 2, 1946, thiouracil was stopped for one week because of joint pains and chilly sensation and then resumed in a dosage of 0.1 gram daily.

On April 3, 1946, the patient was examined at the office. Her eyes were no longer prominent. There was no vasomotor blotching of the skin; body nutrition was improved, and heart action was irritable, but quieted on held breath. The metabolic rate was plus 3 per cent, pulse 88, temperature 97.8°, and blood pressure 130/80. Cholesterol was 347 mg. and sedimentation rate 8 mm. in one hour. Hemoglobin was 89 per cent, red blood cells 4,620,000, and white blood cells 6,400. She was continued on thiouracil, 0.1 gram a day.

In June, 1946, she was seen by Dr. Jones after a bruising auto accident. He found clinical evidence of reactivation of the hyperthyroidism.

The dose of thiouracil was increased to 0.1 gram three times a day, without any amelioration in symptoms. It was now obvious that our only recourse was surgical removal of the thyroid gland and that promptly. So, on June 27, 1946, thiouracil was stopped, and Lugol's solution 15 drops three times a day was started and sedatives prescribed.

On July 10, 1946, the patient re-entered the Miller Hospital and on July 11 Dr. Jones performed a bilateral partial thyroidectomy with no undue bleeding or complications.

The microscopic diagnosis of removed tissue was "hyperplastic goiter, lugolized." The patient was out of bed on the third postoperative day, walked on the fifth day and went home on the ninth day.

A month later her metabolic rate was minus 11 per cent, pulse 66 to 70, temperature 98.6°, leukocytes, 8,300, and cholesterol 278 mg.

DR. M. B. VISSCHER, University of Minnesota: I want to congratulate Dr. Rea on his studies with the use of spinal anesthesia in the attempt to eliminate some of the hazards in thyrotoxicosis. There is a very good physiological rationale for the type of procedure he is using. I think he would be the first to admit that only the future will tell what practical significance this innovation may have in the treatment. I feel sure he will add something to our knowledge about the thyroid gland and I want to urge him to carry on these studies on the thyroid gland. I think he is doing a very good job.

DR. REA, in closing: I wish to thank those who discussed this paper. I believe that thiouracil should be used only in the more severely toxic cases of goiter. The slightly toxic cases can be prepared adequately by iodine therapy without thiouracil.

I am glad the question of evaluating the basal metabolic rate was brought out in the discussion. It should be remembered that the basal metabolic rate is a laboratory test and is subject to error. Personally, I put more emphasis on whether or not the patient is gaining weight, rather than the lowering of the basal metabolic rate in determining the progress of the thyrotoxic patient under therapy. A thyrotoxic patient with a basal metabolic rate of plus 50 per cent that goes down to a plus 20 per cent, but who is losing weight, is a poorer risk than a similar patient whose basal metabolic rate remains stationary but who is gaining weight.

EXPERIENCES IN THE TREATMENT OF HYDROCEPHALUS IN INFANTS

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The birth of a hydrocephalic infant has usually been faced with despair by the obstetrician, pediatrician and the family from the earliest ages. Only in the last ten years has there been an honest hope that the child will be one of the few which will either recover spontaneously or be a candidate for surgical amelioration of his condition.

This discussion is limited to hydrocephalus occurring in early infancy. It is a discussion of internal hydrocephalus in which the fluid is within the ventricular system. External hydrocephalus, caused by an excess of fluid in the subarachnoid space, or by subdural hematoma or hygroma, is a rare occurrence and is only mentioned in passing. Hydrocephalus occurring after infancy is due, in 95 per cent of cases[4], to tumors or cysts and will not be included.

There are no thorough studies of any large group of hydrocephalics as regards etiology and prognosis. The incidence is suggested by several authors. Dott and Levin[11] found sixty cases of hydrocephalus not caused by tumor in 700 cases of verified tumor. Wilder and Moldavalsy[27] record eight cases in 6,000 deliveries, while Putnam[19] states that according to Murphy there were found eighty-eight cases of hydrocephalus alone or associated with spina bifida in approximately 130,000 births. Putnam considers, however, that there are probably twice as many, as reported, as a large number do not develop until weeks or months after birth. Haynes[16] states that in 183,044 admissions to the Children's Hospital, there were 334 cases of hydrocephalus. These figures are certainly not satisfying. It is very important to know the percentage chance that any infant with hydrocephalus has of spontaneous recovery or of recovery by conservative means before subjecting it to a procedure with a rather high mortality. This would necessitate a careful evaluation of a large number of cases and such a study apparently has not been made. In all probability there are numerous mild cases which go unrecognized, but when a child has sufficient hydrocephalus to cause recognition and any concern, the chances of its spontaneous correction are apparently not small, according to Bucy[3] and Penfield,[18] although Putnam[19] states he has never seen a spontaneous recovery. It is our impression that if an infant has such a degree of hydrocephalus that the family or pediatrician is concerned, the chances are very great against recovery without treatment.

The cerebrospinal fluid and the subarachnoid spaces were first described by Cottugno[12] in 1784. According to Fraser and Dott[14] the cerebrospinal fluid is probably not produced before the fifth month of intra-uterine life as it is only after this time that the foramina of Luschka and Magendie appear as perforations in the tela choroidea. Their reasoning is by implication for if the fluid was secreted before this time it could not be absorbed and hydrocephalus would always result due to the as yet unpatent foramina. It is possible, however, that cerebrospinal fluid may have other avenues of exit in intra-uterine life. Browning[2] states that in fetal life there are spinal afferent vessels, possibly similar to lymphatics, which lead out through the spinal nerves as shown by Key and Retzius. This is the exit for cerebrospinal fluid in most animals and possibly is an avenue of exit in fetal and early infant life. If Fraser and Dott are correct, however, a congenital hydrocephalus would begin at the earliest after the fifth month of intra-uterine life.

The origin of the cerebrospinal fluid in the choroid plexus, its circulation through the aqueduct of Sylvus to the fourth ventricle and to the basal cisternae by way of the foramina of Luschka and Magendie, and thence to the arachnoid villi where it is absorbed, is quite well established. Hassin[15] is one of the few who question the fact that the cerebrospinal fluid is a product of the choroid plexus. He cites numerous cases of marked hydrocephalus with an atrophic, sclerosed choroid plexus which is imbedded in the brain and which could not secrete fluid. There may be some secretion of cerebrospinal fluid, however, in the perivascular spaces. Penfield[18] states that there is probably some absorption of cerebrospinal fluid by the ventricles themselves. Foley[13-1,13-2] has demonstrated a reversibility of flow through the choroid plexus. The spontaneous arrest of hydrocephalus may possibly be explained by some such process.

The surgical treatment of infantile hydrocephalus, however, is based on the well-established evidence of the production of the cerebrospinal fluid by the choroid plexus and its absorption over the surface of the brain.

Inaugural thesis.

There are two types of infantile internal hydrocephalus, obstructive and non-obstructive or communicating. In the first instance there is an obstructive mechanism so that fluid is unable to reach the spinal subarachnoid space due to an obstruction somewhere from the choroid plexus down to and including the foramina of Luschka and Magendie. Sachs,[23] reporting the largest series of operated cases in the literature (ninety-eight in all), states that fifty-four (60 per cent) were communicating types and forty-two (46 per cent) were obstructive in nature. Fraser and Dott[14] found that six cases out of twenty-one were communicating. In seven of their cases there was a definite history of birth trauma. The common causes of obstructive hydrocephalus are congenital artresias, ependymitis or arachnoiditis caused by toxins, infection or hemorrhage. Obstructive hydrocephalus frequently accompanies spina bifida due to the Arnold-Chiari deformity. Russell and Donald[22] describe the Arnold-Chiari deformity, first reported by Arnold in 1894 and shortly thereafter by Chiari, as primarily a deformity of the cerebellum. The fourth ventricle is elongated. The foramina of Luschka and Magendie lie below the foramen magnum and, because of the lack of space, fluid is unable to enter the basal cisternae. I shall further discuss this important syndrome under the subject of treatment.

In the communicating type of hydrocephalus, fluid is able to leave the fourth ventricle but the mechanism of absorption in the subarachnoid spaces is faulty, due to either failure of development of the subarachnoid spaces, arachnoiditis, ependymitis caused by toxins, infections or hemorrhage. Internal hydrocephalus is rarely if ever caused by hypersecretion of cerebrospinal fluid.

Toxoplasmosis,[1] a protozoan infection, which Cowen and Page[1] in 1939 showed could be transmitted to man is also a frequent cause of hydrocephalus.

Hydrocephalus may be congenital or acquired after birth.

Penfield studied twenty-seven cases and of these, seventeen were present at birth and seven developed after birth. In at least five cases he states that an inflammatory process started *in utero*. In twenty-six cases treated by Putnam,[21] fifteen were congenital. Dandy and Blackfan found in fifty-four cases of obstructive hydrocephalus, 21 per cent were congenital, while Bucy[3] found about 50 per cent of forty-five cases of communicating hydrocephalus were congenital.

Probably over half of the cases of infantile hydrocephalus are present at birth. In some instances there is such an aplasia of brain substance that either the hydrocephalus must have been present for many months or there was a congenital absence of brain tissue. In either event the prognosis is extremely poor no matter what procedure is attempted.

The pathological findings depend upon whether the hydrocephalus is communicating or obstructive. The white matter is stretched and is destroyed long before there is destruction of the gray matter. It is surprising to note the extent of damage in some individuals in whom there still remains a high degree of intelligence and function. Of course, the basal nucleii are little affected until late; therefore, a fairly normal function is possible even with a tremendous hydrocephalus. Cases have been recorded in which there has been a definite return of cortical thickness after relief from hydrocephalus. However, it is conceded by all that if the cortex is less than 1 cm. in thickness, efforts to treat the child should be abandoned, as only an imbecile will result.

Diagnosis

The determination of the presence of hydrocephalus is not always easy, particularly in the early stages. When one considers that diagnostic procedures such as spinal puncture, communication tests and air studies carry a definite risk, one must be quite certain that a hydrocephalus is developing before subjecting the infant to these procedures. If there are doubts, it will do no great harm to observe the size of the head over a period of several weeks before undertaking more active diagnostic measures.

If there is evidence that the size of the head is increasing out of proportion to the normal, the first procedure is a diagnostic ventricular tap, to rule out subdural collection of fluid. The next consideration in diagnosis is the determination of whether the hydrocephalus is communicating or obstructive. At the same time the severity of the hydrocephalus can be determined. The most satisfactory test to determine the type is the communication test. One c.c. of phenosulphopthalein is injected into a lateral ventricle and a spinal puncture done twenty to thirty minutes later. If there is an obstructive hydrocephalus there will be no dye recovered in the spinal fluid. Pressure readings of both ventricular and spinal fluid should be taken.

The width of the cortex should be noted, as a cortex of less than 1 cm. in thickness prognosticates a poor result.

Encephalography is of some value but encephalography carries some risk, and as a rule one has ample evidence of the type of hydrocephalus and the adequacy of the cortex without this procedure.

Other diagnostic procedures are secondary. One attempts to determine the cause of the obstructive or communicating hydrocephalus, whether it be toxoplasmosis, syphilis, Arnold-Chiari deformity, congenital aplasia or nonspecific infection. Tumor as a cause of early hydrocephalus is extremely rare.

Treatment

There is no doubt that there are spontaneously averted cases. There are no records of what this percentage is. It must, however, be small.

The excellent historical review by Davidoff[8] in 1939 and by Haynes[16] demonstrates the wide variety of surgical methods used in the treatment of infantile hydrocephalus.

Almost every means imaginable for draining the cerebrospinal fluid has been used. The drainage of spinal fluid outside the ventricles is as old as the hills. It was tried by Hippocrates and Celsus, and was resurrected by Von Bergman, Kocher, Lane and many others. All met with failure.

Drainage into the subcutaneous tissues, peritoneum and dural sinuses have all been attempted with poor results. Perhaps the best of these procedures is that described by Torquildsen[25] whereby he drains the lateral ventricles into the cisterna magna by means of a tube buried subcutaneously.

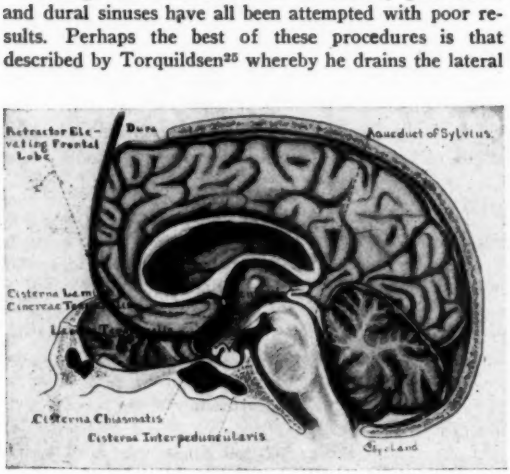

Fig. 1. Drawing to demonstrate the lamina terminalis and the point of puncture. From Stookey and Scarff: Bull. Neurol. Inst. New York, 5:367, (Aug.) 1936.

The three methods which have brought the best results in the treatment of infantile hydrocephalus are (1) the so-called "puncture" operations by means of which fluid is let out of the closed ventricular space into the subarachnoid spaces where it may be absorbed; (2) the operations directed against the choroid plexus itself in which either coagulation or extirpation is performed; and (3) the operation of the decompression of the foramen magnum in cases of Arnold-Chiari deformity.

The earliest so-called puncture operations were described first by Anton and Bramman in 1908. They recommend puncture of the corpus callosum, the so-called Balkenstitch procedure. This procedure has gradually been discarded because of failure of the puncture opening to remain patent. However, as late as 1927 Jennings[17] reported nineteen cases, with five deaths and only three good results.

Dandy[5] first advocated a puncture operation which has been successful in many cases, i.e., puncture of the lamina terminalis into the anterior wall of the third ventricle (Fig. 1). The two cases presented in detail in this paper were treated in this manner. Dandy modified his procedure by a temporal approach and so that the drainage was from the third ventricle into the cisterna interpeduncularis. White[26] does not believe this is necessary and gives good evidence that the puncture in the lamina terminalis remains open.

In obstructive hydrocephalus in infants, the puncture of the lamina terminalis is a rational procedure which has given satisfactory results in our hands.

Shunting operations are satisfactory for obstructive types of hydrocephalus, but in communicating hydrocephalus where absorption is faulty and there are no obstructed passages, the most successful operations have been in attempts to decrease the output of cerebrospinal fluid. Dandy[6] made the first attack in 1918 when he extirpated the choroid plexus in four cases. This method has been replaced by cauterization of the choroid plexus, although there are some neuro-surgeons who are again attempting extirpation.

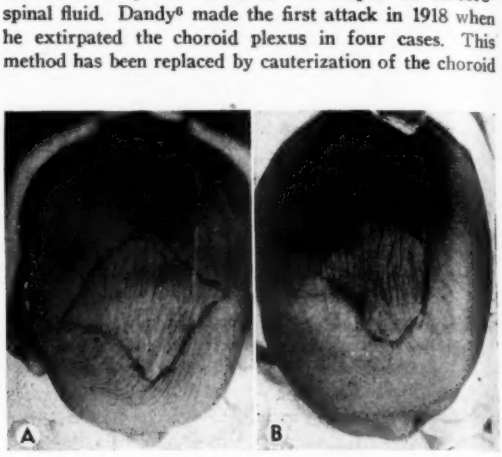

Fig. 2. (A) Size of anterior fontanelle before cauterization of the choroid plexus. (B) Size of anterior fontanelle one month following cauterization of the choroid plexus on one side.

Putnam[20] in 1935 first reported twenty-two patients in whom he had cauterized the choroid plexus by a bipolar endoscope. Only nine survived a period of four to fifteen months but five of these were well and normal, two were improved and two unimproved. In 1938 he reported a 21 per cent mortality with only two deaths in his last sixteen cases. Scarff[24] almost simultaneously reported similar results.

This method has given satisfactory results. It consists of bilateral occipital trephine with opening into the ventricles and cauterization of the choroid plexus of the lateral ventricle either by direct vision or by endoscopic methods. The two sides are cauterized at different operations. The technical aspects of the operation will not be discussed here. Suffice it to say there is ample evidence that cauterization of the choroid plexus is a very satisfactory method of decreasing the cerebrospinal fluid production (Fig. 2, a and b).

The third method of treating hydrocephalus is only applicable in those individuals who have an Arnold-Chiari deformity. D'Errico[9] first recommended unroofing the foramen magnum in such cases. He reported six cases with three satisfactory results. In 1942 he reported[10] a mortality of 12.5 per cent. In hydrocephalus associated with spina bifida, the Arnold-Chiari deformity is usually present and a cerebellar decompression is indicated. In some instances the choroid plexus may also have to be cauterized.

Results

If one recognizes that infantile hydrocephalus is present at birth in probably one-half of the cases, and the many of these are far advanced or there is a definite aplasia of the brain, the prognosis is discouraging at

the outset. Nevertheless one successful result out of many cases cannot be forgotten or cast aside. The remark is heard so often: "What is the use, they will only grow up to be imbeciles?" That is true to some extent but it reflects our failure to recognize the infant who will be imbecilic if saved by operation, and should not be a reflection on the operation in the properly selected case.

Thirteen of the cases which have been studied are collected cases from the neurosurgical service at the University Hospital, and four are from the authors' series in Saint Paul.

Five of the seventeen cases were patients with hydrocephalus associated with spina bifida and with associated Arnold-Chiari deformity. One (BH) died postoperatively—a mortality of 20 per cent. One (NC) was a mental defective four years after operation, in whom operation was originally carried out at the insistence of the family, as the prognosis was admittedly poor. One (PB) living four years after is in fair condition, a cauterization of the choroid plexus having been performed following decompression. One (CY) was living and well one year after operation and was apparently normal. One (BB) was living and apparently normal five months after operation.

Thus in two of five cases the operation appeared to have produced a satisfactory result. When one realizes that this condition is secondary to another serious defect, a meningocele, a satisfactory recovery in 40 per cent is encouraging.

There were eight cases in which the etiology was undetermined. Two of these cases (TS) and (JS) were obstructive and were treated by puncture of the lamina terminalis. Both are living and normal thirteen and seven months after operation. Six were treated by cauterization of the choroid plexus. Two died postoperatively, and the remaining four are discouraging. Although the hydrocephalus was averted, not one has developed properly. This is the most discouraging group. The hydrocephalus has been averted but the child's development has been subnormal. The majority of these patients probably had their hydrocephalus *in utero* and as evidenced at operation had extremely thin cortices. The only positive statement that one can make about these cases is that hydrocephalus can be controlled by cauterization of the choroid plexus. Failure is due to lack of recognition of the chance of normal development rather than to the operation.

Two infants with congenital mal-development of the cerebellum were operated upon—one by puncture of the lamina terminalis and one by cerebellar decompression. Both died.

Only two cases of hydrocephalus caused by proven toxoplasmosis are included in this series. One (TH) has developed normally after cauterization of only one side. One (RLH) is progressing normally after six months.

In recapitulation, seventeen cases have been operated upon. Five operative deaths are recorded—a mortality of 29 per cent over all.

There are six patients who are developing properly. Satisfactory results in 35 per cent of these cases is not a remarkable record. But if one could be able to determine the prognosis for each case and refuse operation for those with a poor prognosis, operation will cure 35 per cent of these children with hydrocephalus who would otherwise live only a few years.

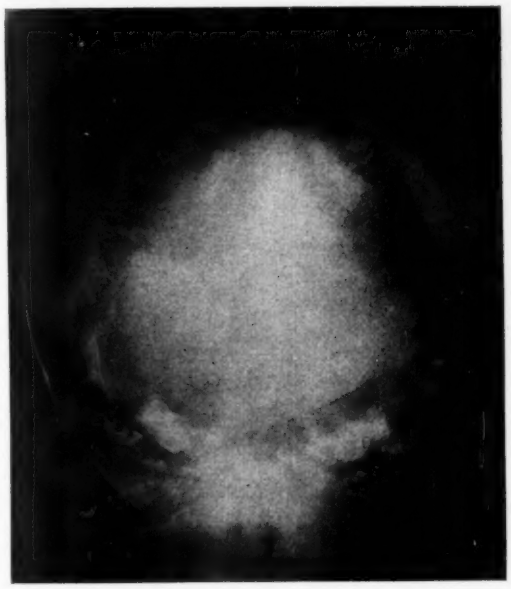

Fig. 3. (Case 1) Occipital view of the skull shows a marked separation of the sutures.

Case Reports

Case 1.—T.S. was first admitted to the Children's Hospital as a patient of Dr. Fred Ouellette on October 15, 1945. He was thirteen months old. His birth had been normal. His past history was negative except that at the age of ten months he developed chicken pox. Since that time he had been irritable and disliked any disturbance such as noise or movement. Although he had vomited before his chicken pox the vomiting had become almost continuous the week before admission. He could no longer walk.

Physical examination revealed a well-nourished child, not acutely ill but very irritable. The general examination was negative but the neurological examination (Dr. Gordon Kamman) revealed optic atrophy, right; left knee jerk increased on the right. Spinal fluid: colloidal gold negative, protein 112 mg., cell count 2, chloride 710 mg., sugar 70 mg. X-rays revealed slight enlargement of the skull with separation of the sutures (Fig. 3). He remained in the hospital six days, during which time he was very restless and irritable. He was readmitted fourteen days later. At this time he was much more irritable, did not like bright light and there was some bulging of the fontanelle. There was a right sixth cranial nerve paresis, optic atrophy on the right and a 3 diopter choked disc on the left. On November 6, 1945, communication tests revealed no dye appearing in the spinal canal after insertion into the ventricle. Because the symptoms seemed to have been definitely a sequela of chicken pox, an obstructive hydrocephalus due to encephalitis rather than to a tumor was con-

sidered to be the most likely etiology. Consequently, on the same day a puncture of the lamina terminales was performed and a free flow of fluid obtained, colored by the dye.

Postoperatively fluid collected beneath the skin flap,

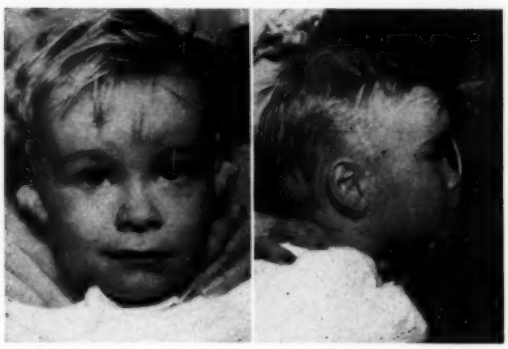

Fig. 4. (Case 1) One year after the lamina terminalis had been punctured.

and frequent aspirations were necessary. Because the fluid did not seem to be absorbing, an attempt to cauterize the choroid plexus was made but the ventricles were collapsed. The brain appeared of fairly normal thickness. After about three weeks the fluid collecting beneath the scalp suddenly ceased and the patient was discharged after thirty-six days. The patient appeared to have only light perception. He remained irritable for three or four weeks, then suddenly improved and appeared to notice his surroundings.

Shortly thereafter he began to sit up, to walk and to develop normally. He developed poliomyelitis in July, 1946, but is recovering and according to all examinations is a normally developing child (Fig. 4).

Case 2.—J. S. was admitted to the Children's Hospital by Dr. Ray Shannon on May 25, 1946. She was five months old. She was a full-term baby and was delivered spontaneously. She appeared absolutely normal to the mother, and as a result medical care was not sought until a neighbor called the mother's attention to the fact that the baby's head was larger than normal.

On admission, the findings were essentially negative except that the anterior fontanelle measured 14 by 10 cm. and the circumference of the head was 48 cm., which was approximately 6 cm. larger than normal.

Puncture through the anterior fontanelle revealed the cortex to be approximately 1 cm. thick on the left and 2 cm. thick on the right. A communication test revealed a block, as no dye was recovered in the spinal fluid. The cell count, protein, colloidal gold curve and Kahn test were normal.

On May 31, 1946, a puncture of the lamina terminales was performed. Her postoperative course was uneventful except for a fever up to 103° for a few days.

The child now has a head 52 cm. in diameter. The fontanelles are sunken. She looks like a normal child and is beginning to stand up. Her mother thinks she is further developed than her other children were at the same age.

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Discussion

Dr. E. F. Robb, Minneapolis: All pediatricians see a number of these cases, which have been most discouraging as far as I am concerned. A few have seemed to cure themselves but most of them have gone on to a fatal termination. The results from surgery have in my experience been 100 per cent bad. Dr. Ritchie's most excellent paper tonight should give us renewed courage. He is to be congratulated on his fine work.

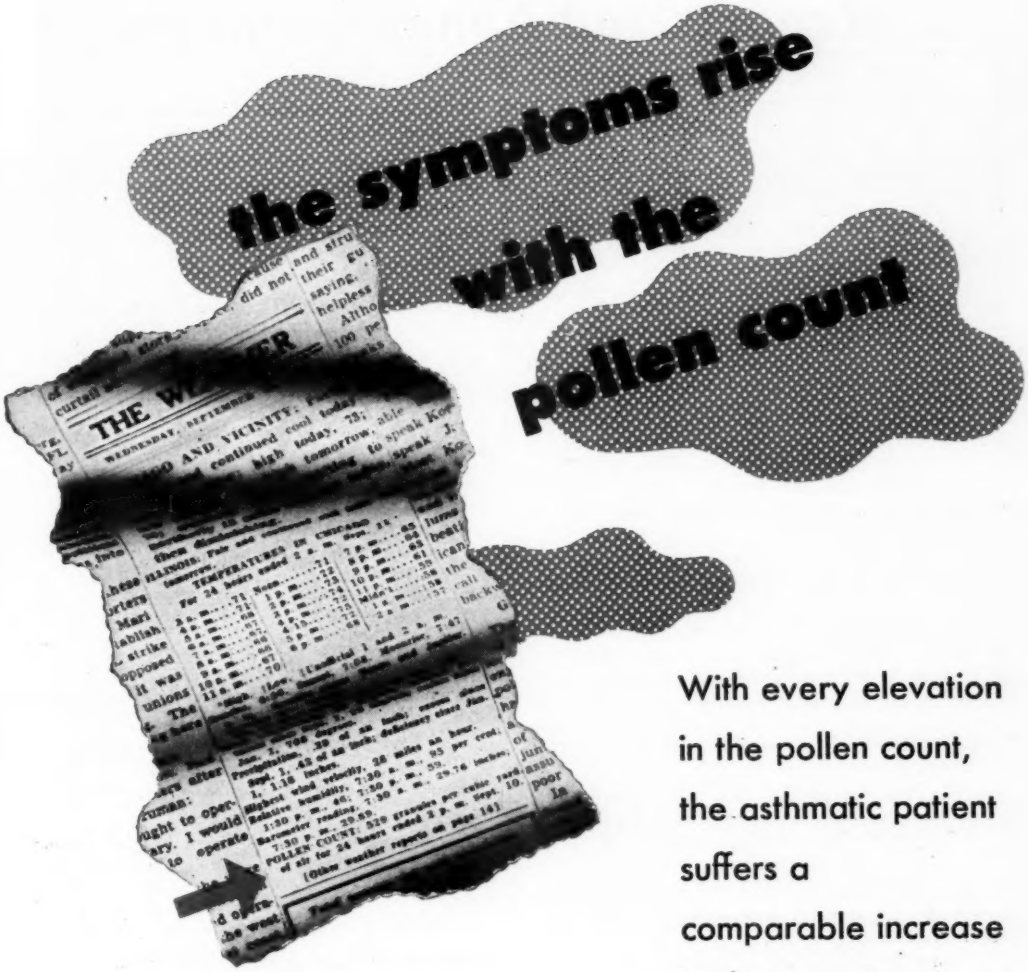
Dr. Ritchie, in closing: I appreciate the discussion. Regarding the thickness of the cortex, I may have been somewhat misleading. In estimating the thickness of the cortex, one must subtract about 1 cm. from the depth at which ventricular fluid is obtained on puncture through the fontanelle.

Inasmuch as the gray matter is not destroyed until late, there is a good opportunity for recovery of function after the hydrocephalus has been relieved.

Although the results are not by any means perfect, there are a sufficient number of recoveries to warrant a careful evaluation of all cases of hydrocephalus before determining that they are hopeless.

The meeting adjourned.

A. E. Cardle, M.D., *Secretary*



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RESEARCH IN THE SERVICE OF MEDICINE

Reports and Announcements

MEDICAL BROADCAST FOR JULY

The following radio schedule of talks on medical and dental subjects by William O'Brien, M.D., Director of Postgraduate Medical Education, University of Minnesota, is sponsored by the Minnesota State Medical Association, the Minnesota State Dental Association, the Minnesota Hospital Service Association in cooperation with the Minnesota Hospital Association and the Minnesota Nurses Association.

1	9:00 A.M.	WCCO	Blue Cross Enters 14th Year
3	9:00 A.M.	WCCO	Minnesota Medicine
8	9.00 A.M.	WCCO	New Field in Nursing
10	9:00 A.M.	WCCO	Body Heat and Hot Weather
15	9:00 A.M.	WCCO	Why Hospital Costs Are Rising
17	9:00 A.M.	WCCO	Food Infections
22	9:00 A.M.	WCCO	Increased Demand for Nurses
24	9:00 A.M.	WCCO	Skin Care in Summertime
29	9:00 A.M.	WCCO	Costs of One Operation
31	9:00 A.M.	WCCO	Getting Ready for School

INTERNATIONAL COLLEGE OF SURGEONS

The International College of Surgeons, United States Chapter, will hold its twelfth annual Assembly and Convocation in Chicago, September 28 to October 4, 1947.

The program will include operative and non-operative clinics, demonstrations, symposia, forums, medical motion pictures, exhibits and the formal dedication of the new library and permanent home of the United States Chapter. All meetings, with the exception of the operative clinics, will be held in the Palmer House and the Stevens Hotel.

Copy of the program and detailed information may be obtained by writing Max Thorek, M.D., Co-chairman, 1516 Lake Shore Drive, Chicago, Illinois.

AMERICAN COLLEGE OF PHYSICIANS AND SURGEONS

Dr. Julian DuBois, Sauk Centre, has been elected president of the American College of Physicians and Surgeons. Other recently elected officers of the organization are Dr. C. H. Pierce, Wadena, first vice president; Dr. A. E. Ritt, Saint Paul, second vice president; Dr. Henry D. Deissner, Minneapolis, third vice president, and Dr. O. A. Lenz, Minneapolis, secretary-treasurer.

The organization will hold its first annual dinner on June 29 at the Spalding Hotel in Duluth. Speakers at the dinner include Dr. Charles A. Dawson, president of the Wisconsin Medical Society, and Dr. F. G. Benn, Minneapolis, president of the Minnesota chapter.

MISSISSIPPI VALLEY MEDICAL SOCIETY

The twelfth annual meeting of the Mississippi Valley Medical Society will be held in Burlington, Iowa, October 1, 2 and 3, 1947. Over twenty-five clinical teachers from the leading medical schools of the country will conduct this postgraduate assembly, the entire program having been planned to appeal to general practitioners. Dr. Edward L. Bortz, president of the AMA, will be the principal speaker at the annual banquet, at which talks will also be given by the presidents of the Illinois, Iowa and Minnesota Medical Associations.

All ethical physicians are invited to attend, and for the first time in history no registration fee will be charged. A program may be obtained from Dr. Harold Swanberg, Secretary, 209 W. C. U. Building, Quincy, Illinois.

NORTHERN MINNESOTA MEDICAL ASSOCIATION

Announcement has been made that the annual meeting of the Northern Minnesota Medical Association will be held on Saturday, September 6, at Breezy Point Lodge, Pequot Lakes (near Brainerd).

The following program is scheduled for the one-day meeting.

"Abdominal Hodgkin's Disease"—Dr. W. O. B. Nelson and Dr. Leonard Dwinnell, Fergus Falls.

"Some Practical Aspects of the Rh Factor"—Dr. A. H. Wells, Duluth.

"The Diagnosis of Congenital Cardiac Defects Which Are Amenable to Surgery"—Dr. Thomas J. Dry, Rochester.

"The Management of Lesions of the Rectal Outlet"—Dr. Louis A. Buie, Rochester.

"Clinical Evaluation of New Developments in Allergy"—Dr. Albert V. Stoesser, Minneapolis.

"The Psychosomatic Component of Disease"—Dr. O. L. Norman Nelson, Minneapolis.

"Clinico-Roentgen-Pathological Conference"—Dr. E. L. Tuohy and associates, Duluth.

The meeting will close with an evening banquet, at which Governor Luther W. Youngdahl will be the principal speaker.

HENNEPIN-RAMSEY COUNTY SOCIETIES

At the first joint scientific meeting of the Hennepin and Ramsey County Medical Societies, held May 19 in the auditorium of the University of Minnesota Museum of Natural History, the principal speakers were Dr. James D. Bisgard, professor of surgery at the University of Nebraska, and Dr. Edgar S. Gordon, professor of medicine at the University of Wisconsin. Dr. Bisgard spoke on "Intra-thoracic Tumors," and Dr. Gordon discussed "Deficiency Diseases."

SOUTHWESTERN MINNESOTA SOCIETY

At a dinner meeting of the Southwestern Minnesota Medical Society, held June 3 at the Hotel Thompson in Worthington, Dr. R. W. Koucky, Minneapolis, spoke on "The Rh Factor," and Dr. John Stam, Worthington, gave a report on the cyanotic condition produced in infants by water heavily impregnated with nitrates.

At a business meeting of the society on May 20, Dr. Hermanus DeBoer of Edgerton reviewed the history of the Southwestern Minnesota Medical Society, which was founded in 1888. Dr. B. O. Mork, Jr., discussed a re-

cent meeting of the state association of county medical officers.

UPPER MISSISSIPPI SOCIETY

Fifty-four members of the Upper Mississippi Medical Society, and their wives, were guests of the Bemidji Medical Society at a meeting held May 24 at the Cyrana Lodge on Lake Beltrami. Dr. Charles W. Vandersluis and Dr. Sidney F. Becker, both of Bemidji, were in charge of arrangements for the meeting, which was presided over by Dr. Otto F. Ringle, president of the Upper Mississippi Society.

The major part of the scientific program consisted of a discussion of low back pains by Dr. M. S. Henderson, professor of orthopedics at the Mayo Clinic, and by Dr. William Peyton, professor of surgery at the University of Minnesota.

WASHINGTON COUNTY SOCIETY

The Washington County Medical Society met for dinner on the evening of June 24, 1947, to honor one of its members, Dr. James H. Haines of Stillwater, who has completed fifty years of medical practice.

Dr. Haines was graduated from Rush Medical College, Chicago, in 1895 and was licensed to practice medicine in 1897. He went to Stillwater shortly after graduation and started his medical life as a house physician at the Stillwater Hospital, now known as Lakeview Memorial Hospital. Shortly after that he opened an office for the general practice of medicine, and he remained in active practice until January 1, 1947. Since that time he has been enjoying a much-needed rest.

Following the dinner meeting, the evening was spent in listening to tales by Dr. Haines and others of the early years of practice. A gift was presented to Dr. Haines in memory of the occasion.

MEDICAL ECONOMICS
NATIONAL HEALTH BILL

(Continued from Page 785)

provide federal assistance to states for the establishment of medical and hospital services for those whose low income makes it difficult or impossible for them to get adequate care. They further pointed out that health functions of the federal government are of sufficient importance to justify their separation into a unit headed by persons trained and experienced in health work. They especially favored the provisions of S.545 for local participation and administration, which would in every case make the community feel that it is carrying out the program according to its best judgment.

American Dental Association officials have also voiced their approval of the philosophy embodied in the Taft Bill, as opposed to that motivating such legislation as the Wagner-Murray-Dingell Bill. They point to the greater freedom to states in direction of their own programs and favor expending dental care to children whose parents cannot meet the cost of such care, but emphasize that such a program should be at the community level.

As the hearings progress, it is clear that the evidence is piling up in favor of this bill and that it shows considerable possibility of ultimate passage through Congress.

In Memoriam

GEORGE RALPH CHRISTIE

Dr. G. R. Christie, a practioner of Long Prairie since 1884, died January 20, 1947, at the age of eighty-nine.

Dr. Christie was born January 19, 1858, in Berlin, Wisconsin. After teaching for several years, he entered Rush Medical College from which he graduated in 1882. He began practice in Montello, Wisconsin, but moved to Long Prairie in 1884.

On September 1, 1887, he was married in Milwaukee to Susan West. Four children were born to them, three sons, and a daughter who passed away at the age of eight. Dr. Christie was left a widower in 1910. In 1911 he married Ida Lewis Mason who died in 1944.

Dr. Christie took an active interest in his community and county. He was one of the incorporators of the Bank of Long Prairie, and was interested in banking circles in neighboring towns. He was a past president of the Upper Mississippi Medical Society, president of the local board of education for upwards of twenty years, served as president of the village council and was president of the county pension board for a number of years.

In 1938, Dr. Christie, along with Dr. B. F. Van Valkenburg, was honored at a dinner by the Long Prairie Commercial Club, and tribute was paid to his long medical service and his contributions to community development.

A member of the Masonic Lodge, the Upper Mississippi Medical Society, the Minnesota State and American Medical Associations, the Great Northern Surgeons' Association, Dr. Christie gave valuable medical and civic service to his community for a long period of time until his retirement a few years ago. He will long be remembered by his many friends.

Of General Interest

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

Annual meeting—New Ulm, Minnesota, September 8, 1947.

* * *

In September Dr. G. M. A. Fortier, Little Falls, expects to move into his new one-story medical office building, on which construction was begun in June.

* * *

A new member of the More Hospital and Clinic staff, in Eveleth, is Dr. Adrian W. Davis, who became a resident of Eveleth during the first week of June.

* * *

Dr. Sheldon Clark Reed of Harvard University has been appointed director of the Dwight Institute of Human Genetics, effective in September, 1947.

* * *

Dr. R. G. Tinkham, who is associated with Dr. John Eiler in Park Rapids, enrolled for a course in obstetrics and gynecology in Chicago during June.

* * *

Medical dean of Crow Wing County with fifty-one years of practice behind him, Dr. John Thabes, Sr., spoke on the progress of medical science at a meeting of the Brainerd Lions Club on May 14.

A week of vacationing in Wisconsin during June climaxed the end of his first year of practice in Glenwood for Dr. J. T. Gericke of that city.

* * *

Dr. T. J. Hughes, a member of the Mayo Clinic staff for four years, is now associated with a group of physicians in Corona, California, and is specializing in ear, nose and throat and maxillofacial surgery.

* * *

Dr. C. K. Maytum, Rochester, spoke on "Functional Respiratory Disturbance With Hyperventilation as a Cause of Symptoms" at the meeting of the South Dakota State Medical Association in Rapid City on June 3.

* * *

Dr. S. A. Slater, Worthington, and Dr. Carl Howson, Los Angeles, were chosen active vice presidents of the National Tuberculosis Association on June 19 at the annual meeting of the association in San Francisco.

* * *

Eighty-five year old Dr. A. M. Ridgway, Annandale, who is still maintaining his medical practice, was honored by the Annandale Masonic Lodge on June 2 was presented with a fifty-year jewel.

Dr. Catherine Burns, daughter of the late H. D. Burns, Albert Lea, recently became associated in medical practice with Dr. S. A. Whitson and Dr. J. P. Person in offices at Albert Lea.

* * *

One of the speakers at the annual convention of the AMA in June was Dr. W. G. Workman, Tracy, who with Mrs. Workman traveled by plane to Atlantic City for the meeting.

* * *

New offices for the practice of medicine in the specialty of eye, ear, nose and throat diseases have been opened in International Falls by Dr. R. Hugh Monahan, Jr., of that city.

* * *

Dr. William C. Dodds, a member of the Bratrud Clinic in Thief River Falls for more than a year, has entered into partnership with Dr. Donald M. Houston of Park Rapids and has begun his practice in that city.

* * *

On May 29 Dr. W. W. Brown terminated his practice in Isle and began a vacation trip to California. Upon his return he planned to establish his medical practice in Wilmont.

* * *

Dr. Henry E. Michelson, Minneapolis, was elected chairman of the Section of Dermatology and Syphilology at the recent meeting of the American Medical Association in Atlantic City.

* * *

At the annual meeting of the North Dakota State Medical Association, held in Fargo on May 27, Dr. H. O. McPheeters, Minneapolis, presented a paper entitled, "Peripheral Circulatory Disease and the General Practioner."

* * *

In the alphabetic roster of members of the Minnesota State Medical Association, printed in the May issue of MINNESOTA MEDICINE, Dr. Roberta G. Rice's address was incorrectly listed as Aitkin. It should have been Rochester.

* * *

Tracy acquired a new physician in May when Dr. O. J. Esser, formerly of Gibbon, became an associate of Dr. A. D. Hoidale and Dr. W. G. Workman in their clinic in Tracy. Dr. Esser recently completed postgraduate study in New York City.

* * *

Brazilian surgeon Dr. Paulo P. L. Baptista, who has been studying chest surgery and tuberculosis at Glen Lake Sanatorium for two years, recently left the sanatorium to undertake further study in surgical pathology elsewhere.

* * *

Recently elected as first vice chairman of the Minnesota Committee on Local Health Services was Dr. D. A. Dukelow of Minneapolis. The committee is beginning to form plans for resubmitting a new health bill to the next state legislature.

Since January, Dr. Frederick Kottke, Minneapolis, who has a traveling medical fellowship, has studied in Rochester, in New York City, and in Warm Springs, Georgia. His major field of study has been physical medicine, especially as it concerns poliomyelitis.

* * *

Back at work after a seven-month rest to improve his health, Dr. I. F. Seeley, Northfield, has resumed his medical practice. Dr. Seeley spent most of the past winter in Arizona and returned to Northfield in early spring.

* * *

Dr. Robert M. Ahrens, son of Dr. and Mrs. Albert E. Ahrens of Saint Paul, received his degree of doctor of medicine from New York Medical College on June 11. Dr. Ahrens served his internship at Ancker Hospital, Saint Paul.

* * *

Dr. Alvin L. Schultz, Minneapolis, was one of forty-one members of the Ohio State University hospital staff who received certificates of service at the annual dinner for medical and dietary interns at Columbus, Ohio, during June.

* * *

Three Rochester physicians, Dr. M. C. Petersen, superintendent of the Rochester State Hospital, and Dr. H. P. Heersema and Dr. Fred Moersch, Mayo Clinic staff members, attended the annual meeting of the American Psychiatric Association held in New York City during May. Dr. Moersch is a counsellor of the association.

Dr. H. F. Colfer, fellow in medicine in the Mayo Foundation, Rochester, has been granted the National Research Council award for study with Professor E. Adrian, chairman of the Department of Physiology at Cambridge University in England, and will begin a one-year fellowship at Cambridge in the fall.

* * *

Formerly of Watertown, South Dakota, Dr. Stephen Hanten has become associated in medical practice in Caledonia with Dr. J. J. Ahlfs. A graduate of Creighton University in Omaha, Nebraska, Dr. Hanten served his internship at St. Mary's Hospital in St. Louis, Missouri. He was in the army for five years during World War II.

* * *

Dr. Mario Fischer, Duluth health director and acting St. Louis County health officer, was a member of the Minnesota delegation which attended the forty-third annual meeting of the National Tuberculosis Association in San Francisco during June. Dr. Fischer is a director of the association.

* * *

Formerly of Kenyon, Dr. Clifford N. Rudie has opened offices in Staples for the practice of medicine and surgery. A graduate of the University of Louisville, Kentucky, Dr. Rudie served his internship at Miller Hospital in Saint Paul. He practiced in southern Minnesota for a number of years.

* * *

The association of Dr. Henry J. Borge in the practice of medicine and surgery has been announced by Dr.

R. C. Radabaugh, Hastings. Dr. Borge, a graduate of Northwestern University Medical School and a veteran of four years of army medical service, began his medical practice with Dr. Radabaugh in May.

* * *

Dr. Albert V. Stoesser, Clinical Professor of Pediatrics, Medical School, University of Minnesota, and Director of Allergy Clinics of the Department of Pediatrics, was elected a member of the Board of Regents of the American College of Allergists at the annual meeting held in Atlantic City in June.

* * *

Appointment of Dr. M. B. Llewellyn to the position of pathologist at Asbury Hospital, Minneapolis, has been announced. Dr. Llewellyn, a graduate of the University of Minnesota Medical School, has been associated with the pathology departments of Wayne University and Henry Ford Hospital, Detroit.

Dr. F. L. Stutzman, formerly of Newport, now attached to an army preventive medicine section in Manila, Philippine Islands, has been promoted to the rank of captain. A graduate of the University of Minnesota Medical School, Dr. Stutzman entered the army in April, 1946. He has been stationed in the Philippines since September, 1946.

* * *

Dr. George B. Eusterman of the Mayo Clinic has been awarded the Julius Friedenwald medal for outstanding contributions in his specialty of gastroenterology. The award was presented at the annual dinner of the American Gastroenterological Association, held at Atlantic City in conjunction with the AMA meeting in June. Dr. Eusterman was president of the association twenty-five years ago.

* * *

At a meeting of the American College of Chest Physicians in Atlantic City in early June, Dr. Lewis S. Jordan, superintendent of Riverside Sanatorium at Granite Falls, stated that on the basis of studies carried out in Minnesota the eradication of tuberculosis could probably be accomplished within the life span of the coming generation.

* * *

Seventy-five year old Dr. A. Cyr of Barnesville had the honor of pitching the first ball of the season on May 25 when the Barnesville baseball team opened its Red River League schedule with a game with Downer. In a brief ceremony which preceded the throwing of the first ball, Dr. Cyr was presented with an engraved pen and pencil set.

* * *

Dr. George McGeary, Jr., son of Dr. George McGeary, Sr., of Minneapolis, has joined Dr. M. I. Hauge in Clarkfield to form the Clarkfield Clinic.

A graduate of the University of Minnesota Medical School, Dr. McGeary, Jr., served his internship at Ancker Hospital in Saint Paul. He was recently discharged from the army.

* * *

At the recent meeting of the International Congress on Obstetrics, held in Dublin, Ireland, from July 5 to 12, Dr. Ann Arnold of Minneapolis was a member of the American delegation. Dr. Arnold, together with her daughter, Nancy, flew to London in June and planned to travel extensively in Ireland and Scotland in addition to attending the seven-day obstetrical meeting.

* * *

Dr. Arlie R. Barnes, Rochester, was elected president of the American Heart Association at a meeting in Atlantic City in June at which 100 laymen were admitted

to membership in the association. Dr. Barnes succeeds Dr. Howard F. West of Los Angeles. Election of the laymen, who included Harold Stassen, Samuel Goldwyn and Mrs. Clare Booth Luce, was made in accordance with a newly approved reorganization of the association.

* * *

A modern medical office building was recently opened in Belle Plaine by Dr. H. M. Juergens of that city. Architectural features of the offices include the newest type of fluorescent lighting and a radiant heating system, in which the entire floor serves as a radiator. The building has been under construction since last winter when Dr. Juergens' old offices were destroyed in a fire.

* * *

A certificate of merit was awarded to Dr. Karl Pfuetze, superintendent of Mineral Springs Sanatorium, and Dr. William H. Feldman and Dr. H. C. Hinssaw, of the Mayo Foundation, for their exhibit at the AMA convention in Atlantic City in June. Their exhibit, which demonstrated the use of streptomycin in the treatment of tuberculosis, was entitled, "Streptomycin: Experimental and Clinical Observations."

* * *

Three thousand miles were covered by Dr. and Mrs. George Friedell, Ivanhoe, during a two-week June vacation trip which included attendance at the annual convention of the AMA in Atlantic City. A small family reunion was staged at the AMA meeting when Dr. Friedell met with his brother, Dr. Aaron Friedell of Minneapolis, and his nephews, Dr. H. L. Friedell of Cleveland and Dr. Morris Friedell of Chicago.

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Thirteen physicians are co-operating this summer in a revised health program for 4-H members of Nobles County. Conducting examinations and determining health conditions of the 4-H members are Doctors E. A. Kilbride, B. O. Mork, Sr., B. O. Mork, Jr., P. W. Harrison, C. R. Stanley, F. L. Schade, R. P. Hallin, O. M. Heiberg, all of Worthington; E. W. Arnold, D. E. Nealy, L. A. Laikila, all of Adrian; D. J. Halpern, Brewster, and B. M. Stevenson, Fulda.

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Two brothers are now practicing medicine together in Holdingford. Dr. E. J. Schmitz has announced that his brother, Dr. Glenn Schmitz, has joined him in practice at Holdingford, fulfilling a long-held ambition of both brothers.

A graduate of St. Louis University Medical School, Dr. Glenn Schmitz interned at Wheeling Hospital in West Virginia and then served in the army from 1945 until February of this year.

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In Europe to attend a medical conference, Dr. Hulda Thelander, Little Falls, writes that living conditions in Denmark are extremely restricted, that rationing is severe, and that the Danish people have no heat, very little butter or meat, and no fresh fruit, coffee, tea or chocolate. Sweden, on the other hand, has a liberal rationing system and, judging by meals served and store-window displays, is a rich country compared with the

rest of Europe. That, Dr. Thelander writes, does not help the Danish people, however, for the Danes can take only $5 with them if they leave Denmark and they cannot get permission to leave without a good reason.

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Dr. G. B. New, Rochester, discussed "Nasal Deformities, Congenital and Acquired: Methods of Treatment" at the meeting of the Canadian Otolaryngological Society at Minaki Lodge, Ontario, Canada, during the week of June 23.

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At a meeting of the Wyoming State Medical Society during the week of June 23, Dr. J. Grafton Love, Rochester, spoke on "Injuries to the Central Nervous System" and "Spinal Cord Tumors and Protruded Disks as Causes of Backache and Sciatic Pain."

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On July 1, Dr. A. L. Koskela, formerly of Grand Rapids, began an association with Dr. G. A. Miners in the Deer River Clinic. Since his return from military service, Dr. Koskela has been associated with Dr. M. J. McKenna, Dr. F. M. Jolin and Dr. A. V. Grinley of Grand Rapids.

Dr. H. R. Anderson, a member of the Deer River Clinic for the past twelve years, has withdrawn from the clinic and moved to to Arizona.

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Mayo Clinic staff members Dr. P. A. O'Leary and Dr. C. F. Code of Rochester were on the program of the Canadian Medical Association meeting in Winnipeg, Canada, during the week of June 23. Dr. O'Leary spoke on the subjects, "The Present Status of Penicillin in the Treatment of Syphilis" and "Xanthomatoses." Dr. Code discussed a series of papers on the role of histamine in allergy and also presented a paper entitled, "A Study of the Action of Antihistamine Drugs in the Skin of Human Beings."

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On his fiftieth anniversary as a practicing physician, Dr. Fred H. Rollins of St. Charles celebrated by attending a Chicago reunion of former classmates from the class of 1897 of Rush Medical College.

With the exception of a year at White Rock, South Dakota, and at West Salem, Wisconsin, Dr. Rollins has spent his entire medical career at St. Charles. A public-spirited citizen, he has served the community as mayor and for the past forty years as a member of the school board.

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A new physician in Princeton is Dr. W. F. McManus, formerly of Chicago, who is now associated in the practice of medicine with Dr. W. R. Blomberg of Princeton. Dr. McManus graduated from the College of Medicine of Loyola University in 1938 and then served his internship at St. Anne's Hospital, Chicago. After practicing in Chicago for three years, he entered the army and served for thirty-nine months, part of the time as chief of the surgical and laboratory staffs of two hospitals in Florida.

A pre-medical student at the University of Minnesota, Jason Aronson of Little Falls is studying socialized medicine in England this summer. One of forty University students selected by a faculty committee to study conditions and people in Europe for two months, Aronson planned to concentrate on government-sponsored medical programs, considering advantages and disadvantages, gathering information on the attitudes of the laity and the professional men. Students participating in the European study program were selected on the basis of scholarship, leadership and background in their chosen field.

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Two University of Minnesota medical scientists, Dr. Maurice B. Visscher and Dr. John J. Bittner, are touring Austria and Hungary this summer as members of a ten-man team of American and Swiss physicians to promote international exchange of medical and scientific knowledge.

Dr. Visscher, head of the Department of Physiology of the University of Minnesota, is chairman of the group, which is sponsored by the United Nations.

Dr. Bittner, professor of cancer biology at the University of Minnesota, who will tell European physicians of recent development in cancer research, was chosen as president of the American Association for Cancer Research at a meeting on June 2.

Main topics to be discussed by members of the ten-man team at medical meetings in Austria and Hungary include the latest developments in surgery, poliomyelitis, cancer, medicine and psychiatric research.

Red Wing physician Dr. L. E. Claydon, who has circled the globe three times, made seventeen Atlantic crossing and visited every continent in the world, completed his fifty-second year in the practice of medicine on June 12.

A graduate of the University of Minnesota Medical School, Dr. Claydon began his medical practice with Dr. M. H. Cremer at Mezeppa in 1895. After seven years in Mezeppa the two moved to Red Wing and established their practice there. Since 1900, when he went to Germany and Norway for additional medical study. Dr. Claydon has gone on some type of world jaunt every few years, but has always returned to his practice in Red Wing. At the present he has no thoughts of retiring.

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Among the speakers at the forty-third annual meeting of the National Tuberculosis Association in San Francisco in June were Dr. J. A. Myers, professor of medicine at the University of Minnesota, and Dr. H. C. Hinshaw of the Mayo Foundation, Rochester. Dr. Myers participated in a panel discussion on the use of BCG vaccine in tuberculosis. Dr. Hinshaw, vice president of the association, spoke on recent research in tuberculosis and gave an evaluation of the use of streptomycin in the treatment of tuberculosis. President of the National Tuberculosis Association is a former Minnesota man, Dr. William P. Shepard, now of San Francisco, who was formerly on the staffs of the Minnesota State Department of Health and the University of Minnesota School of Public Health.

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